

# **Managerial Economics**

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## MODULE-1:- BASIC ECONOMIC CONCEPTS AND DECISION MAKING

### Nature and Scope of Managerial Economics

Management is the guidance, leadership and control of the efforts of a group of people towards some common objective. It is coordination, an activity or an ongoing process, a purposive process and an art of getting things done by other people. Economics, on the other hand, is a social science, chiefly concerned with the way of society chooses its limited resources, which have alternative uses, to produce goods and services for present and future consumption, and to provide for economic growth. It is obvious from this definition that economics engaged in analyzing and providing answers to manifestation of the most fundamental problem of scarcity. Scarcity of resources results from two fundamental facts of life.

- i) Human wants are virtually unlimited and insatiable.
- ii) Economic resources to satisfy the human wants are limited.

Thus, we can't have everything we want; we must make choices broadly in regard to the following.

- a) What to produce?
- b) How to produce?
- c) For whom to produce?

The three choice problems have become the three central issues of an economy.

Managerial Economics can be viewed as an application of that part of economics that focuses on topics such as risk, demand production, cost, pricing, Market structure etc. Understanding these principles will help to develop a rational decision making perspective and will also sharpen the analytical framework that the executive must bring to bear on managerial decisions. The primary role of economics in management is making optimizing decisions where constraints apply. The application of principle of Managerial Economics will help manager ensure that resources are allocated efficiently within the firm and that the firm makes appropriate reactions to changes in the economic environment. Thus Managerial Economics is concerned with application of economic concepts and analysis the problem of formulating rational managerial decision.

Study of Managerial Economics essentially involves the analysis of certain major subject like. The business firm and its objective, Demand analysis estimation and for casting, production and cost analysis, pricing theory and policies, profit analysis, with special reference to breakeven point; capital Budgeting for investment decisions; completion etc.

Demand Analysis and Forecasting help a manager in the earliest stage in choosing the product and in planning output levels. A study of demand elasticity goes a long way in helping the firm to fix prices for its products. The theory of cost also forms an essential part of this subject. Estimation is necessary for making output variations with fixed plants or for the purpose of new investment in the same line of production or in a different venture. The firm works for profits and optional or near maximum profits depend upon accurate price decisions.

Decision making by management is purely economic in nature, because it involves choices among a set of alternatives alternative course of action. The optimal decision making is an act of optimal economic choice, considering objectives and constraints. This justifies an evaluation of management decisions through concepts, precepts, tools and techniques of economic analysis.

Objective of the firm:-

Firms are a useful device for producing and distributing goods and services. They are economic entities and are best analyzed in the context of an economic model. Traditionally, the objective of a firm is to maximize profit. It is assumed that managers consistently make decisions to maximize profit of the firm. They make decisions that reduce current year profits, so as to increase profits in the future years. To achieve this objective, they incur expenditure on Research and Development(R & D) activities, new capital equipments and major marketing programs, which reduce the profits initially but significantly raise it in the future. Thus, given that both the current and future profits are important, it is assumed that the goal of a firm is to maximize the present or discounted value of all future profits [PV ( $\pi_t$ )]. The goal or objective function for the firm may be expressed as:-

$$\text{Maximize: PV } (\pi_t) = \frac{\pi_1}{(1+r)^1} + \frac{\pi_2}{(1+r)^2} + \text{-----} + \frac{\pi_n}{(1+r)^n}$$

Where  $\pi_t$  is profit in time period  $t$ , and  $r$  is an appropriate discount rate used to reduce future profits to their present value. Using the Greek letter  $\sum$  indicates that each of the terms on the right hand side of the given equation have been added together. Then, the objective function can be written as :

$$\text{Maximize: PV } (\pi) = \sum_{t=1}^n \frac{\pi^t}{(1+r)^t}$$

### **Theory of Demand**

The theory and analysis of demand provides several useful insights for business decision making. Demand is one of the most important aspects of Business Economics, since a firm would not be established or survive if a sufficient demand for its product didn't exist or couldn't be created. That is, a firm could have the most efficient production techniques and the most effective management, but without a demand for its product that is sufficient to cover at least all production and selling costs over the long run, it simply would not survive.

Demand is the quantity of a good or service that customers are willing and able to purchase during a specified period under a given set of economic conditions. The time frame might be an hour, a day, a month or a year. Conditions to be considered include the price of the good in question, prices and availability of related goods, expectations of price changes, consumers' incomes, consumers taste and preferences, advertising expenditures and so on. The amount of the product that consumers are prepared to purchase, its demand, depends on all these factors.

The ability of goods and services to satisfy consumer wants is the basis for consumer demand. This is an important topic in micro-economics because managers must know why consumers demand their products before demand can be met or created.

Consumer behavior theory rests upon three basic assumptions regarding the utility tied to consumption.

First, —More is better! :- Consumers will always prefer more to less of any good or service.

It is often being referred to as the –non satiation principle.

Second, –Preferences are complete:- When preferences are complete, consumers are able to compare and rank the benefits tied to consumption of various goods and services.

Third, –Preferences are transitive:- When preferences are transitive, consumers are able to rank/order the desirability of various goods and services.

#### Utility Function :-

A utility function is a descriptive statement that relates satisfaction or well being to the consumption of goods and services. The utility of a basket of goods depends on the quantities of the individual commodities. If there are  $n$  commodities in the bundle with quantities  $x_1, x_2, \dots, x_n$ , then utility is  $U = f(x_1, x_2, \dots, x_n)$

#### Marginal Utility :- (MU)

Marginal utility measures the added satisfaction derived from a one unit increase in consumption of a particular good or service, holding consumption of other goods and services constant. The relationship between demand and marginal utility can explain the behaviour of demand in relation to price.

#### Law of Diminishing Marginal Utility :-

In general, the law of diminishing marginal utility states that –as an individual increases consumption of a given product within a set period of time, the marginal utility gained from consumption eventually declines. In fact, the law of demand is based on the law of diminishing marginal utility. According to law of Diminishing Marginal utility, a consumer tries to equalize marginal utility of a commodity with its price so that his satisfaction is maximized.

#### Equilibrium of the consumer :-

Let's begin with the simple model of a single commodity X. the consumer can either buy X or retain his money income Y. Under these conditions, the consumer is in equilibrium when the marginal utility of X is equated to its market price ( $p_X$ ).

Symbolically we have,

$$MUX = p_X$$

If the marginal utility of X is greater than its price, the consumer can increase its welfare by purchasing more units of X. Similarly, if the marginal utility of X is less than its price, the consumer can increase his total satisfaction by cutting down the quantity of X and keeping more of his income unspent. Therefore, he attains the maximization of his utility when  $MUX = pX$ .

#### Mathematical derivation of the equilibrium of the consumer :-

The utility function is

$$U = f(qX)$$

Where utility is measured in money terms. If the consumer buys  $qX$ , his expenditure is  $qXpX$ . Presumably the consumer seeks to maximize the difference between his utility and his expenditure.

$$U - pXqX$$

The necessary condition for a maximum is that the partial derivative of the function with respect to  $qX$  be equal to Zero. Thus,

$$\frac{\partial U}{\partial qX} - \frac{\partial (pXqX)}{\partial qX} = 0$$

Rearranging we obtain,

$$\frac{\partial U}{\partial qX} = pX$$

$$MUX = pX$$

#### **Individual Demand and Market Demand**

Individual demand refers to the demand for a commodity from the individual point of view. The quantity of a product consumer would buy at a given price over a given period of time is his individual demand for that particular good. Individual demand is considered from one person's point of view or from that of a family or household's point of view. Individual demand is a single consuming entity's demand. Individual demand is determined by the value associated with acquiring and using any good or service and the ability to acquire it.

Market Demand for a product, on the other hand, refers to the total demand of all the buyers, taken together. Market demand is an aggregate of the quantities of a product demanded by all the individual buyers at a given price over a given period of time. Market demand for a given commodity is the horizontal summation of the demands of the individual consumers. In other words, the quantity demanded in the market at each price is the sum of the individual demands of all consumers at that price.

Table-1 shows the demands of three consumers at various prices of a certain commodity and the total market demand:

Table-1 Individual and Market Demand

Price (in Rs.)	Quantity demanded by consumer A (in units)	Quantity demanded by consumer B (in units)	Quantity demanded by consumer C (in units)	Market demand (in units)
10	15	20	15	50
12	12	15	13	40
14	10	12	10	32
16	08	10	08	26
18	06	08	06	20
20	04	06	05	15

#### Direct demand and Derived demand :

Direct demand is the demand for goods and services that directly satisfy consumer desires. In other words, direct demand is the demand for personal consumption products. The value or worth of a good or service, its utility, is the prime determinant of direct demand. Individuals are viewed as attempting to maximize the total utility or satisfaction provided by the goods and services they acquire and consume. This optimization process requires that consumers focus on the marginal utility of acquiring additional units of a given product, product characteristics, individual preferences and the ability to pay are all important determinants of direct demand.

Goods and services are sometimes acquired because they are important inputs in the manufacture and distribution of other products. Such goods and services which are demanded not for direct consumption but rather for their use in providing other goods and services. Examples of derived demand are production facilities and equipment, natural resources, commercial airplanes,

machines etc. Input demand is derived from the demand for the products they are used to provide. Input demand is called derived demand. In a nutshell, demand for inputs used in production is called derived demand.

#### The demand function:-

A demand function shows the relationship between the demand for a good, say X, and the various factors which cause a change in it. The demand function may be expressed as follows:-

$$D_X = f(P_X, P_Y, M, T, W)$$

Where  $D_X$  = quantity of commodity X demanded per unit of time,

$P_X$  = Price of X,

$P_Y$  = Mean price of all other substitute commodities,

$M$  = consumer's income

$T$  = consumer's Taste

$W$  = Wealth of the consumer

Of the variables mentioned, Taste is difficult to quantify, whereas wealth does not have a direct influence on the demand  $D_X$ . Hence,  $T$  and  $W$  are held constant, and  $D_X$  is assumed to be a function of  $P_X$ ,  $P_Y$ , and  $M$  only.

Demand functions are generally homogenous of degree zero. Homogeneity means that changes in all the independent variables, namely  $P_X$ ,  $P_Y$ , and  $M$  are uniform. If the degree of a homogenous function is zero, then it would imply that when all prices and income change in the same proportion,  $D_X$  would remain unchanged.

$P_Y$  and  $M$  are generally assumed to be the parameters. For simplicity, the demand for X is assumed to be a function of only  $P_X$ . An over-simplified and the most commonly stated demand function is, thus:

$$D_X = f(P_X)$$

Which connotes that the demand for commodity X is the function of its price. The traditional demand theory deals with this demand function specially.



It must be noted that by demand function, economists mean the entire functional relationship, i.e. the whole range of price-quantity relationship, and not just the amount demanded at a given price per unit of time. In other words, the statement, –the amount demanded is a functional of price|| implies that for each possible price, there is a different quantity demanded.

To put it differently, demand function for a commodity relates to the entire demand schedule, which shows the varying amounts purchased at alternative prices over a given time period.

#### Determinants of Demand:-

Demand is a multivariate function and it is determined by many variables. Traditionally, the most important determinants of the market demand are considered to be the price of the commodity in question, the prices of the other related commodities, consumer's incomes and taste. In reality, however, demand depends upon numerous factors. The main determinants of demand are as follows:

##### (A) Price of the commodity in question ( $P_X$ ):-

The price of the commodity and its demand are inversely related. The more the price of a commodity, the less will be its quantity demand and vice-versa.

##### (B) Price of the other associated goods ( $P_Y$ ):-

A change in  $P_Y$  also influences the change in  $P_X$ . However, the direction of such depends upon the nature of relationship between the two goods, namely X and Y:

X and Y are complementary goods, when both goods satisfy a single want. E.g. ink and pen, milk and sugar, car and petrol, etc. When prices of Y rises, the consumer will buy less of Y and also less of X, although the price of X remains unchanged. Thus,  $P_X$  and  $P_Y$  are negatively related.

X and Y are substitutes, if the consumer can use more of X at the cost of Y, or vice-versa. That is, with a fall in  $P_Y$ , the consumer would buy more of Y because it has become cheaper compared to X. Therefore the demand for X will fall and that of Y will increase. E.g. A fall in the price of apple would induce the buyers to buy larger quantity of it. Besides, many buyers of orange may switch over to apple, even though price of orange has not changed.

1. When X and Y have no relationship, the two commodities are said to be independent. e.g. the demand for wheat and milk have no relationship. Under such a situation, even if the price of X( $P_X$ ) falls significantly, demand for Y( $D_Y$ ) remains unchanged.

(C) Income of the consumer (M):-

With an increase in the income, of a consumer, the demand also increases. However, for an inferior good, an increase in income would result in buying smaller quantities of it.

(D) Status of consumer:-

Often, even when  $P_X$ ,  $P_Y$  and M are constant, the consumer's status in the society induces him/her to buy less or more of a good. They have to maintain certain level of living standards, regardless of the problems like that of incidence of loans taken, etc.

(E) Demonstration Effect:-

Sometimes a consumer is motivated to buy some commodity not because it has become cheaper or the income has increased, but because the neighbours/peers have purchased it. This is also called as the –Bandwagon effect. According to it, demand for X is determined not by its utility, price or income, but by what other consumers in the society are doing. On the other hand, there are also consumers who like to behave differently from the others. For example, when all other consumers buy more units of X when  $P_X$  falls, such consumers prefer to buy less of X. This is known as the –Snob Effect.

(F) Seasonal Variations in demand:-

The demand for a good also rises or falls according to the variations in temperature or climate conditions. Demand for ice creams, cold drinks, Air conditioners, etc. are extremely high in summers, whereas demand for blankets and woollens are low.

(G) Spatial variations in demand:-

Demand for a good also varies according to the place or profession in which a consumer is engaged.

(H) Taste of the consumer:-

The demand for a good is also determined by the taste and preference of a consumer. Other things remaining constant, a consumer would buy more or less of a good depending upon his/her choice or preference function. A consumer may like coffee over tea, while another may prefer tea over coffee. Thus a consumer's taste is also an important determinant of demand for a commodity.

For use in managerial decision making, the relation between quantity demand and each demand determining variables must be specified. To illustrate, what is involved, assume that the demand function for the automobile industry is

$$Q = x_1P + x_2P_A + x_3Y + x_4N + x_5r + x_6P_r \text{-----} (1)$$

Equation (1) indicates that, Q, i.e. the quantity demand of automobiles, is a linear function of the average price of new automobiles (P)(in rupees), the average price of substitutes (P<sub>A</sub>)(in rupees), per capital income (Y)(in rupees), population (in crores)(N), average interest rate on automobile loans(r)(in percent), industry advertising expenditure(P<sub>r</sub>)(in -lakhs|| rupees). The notations x<sub>1</sub>, x<sub>2</sub>... x<sub>6</sub> are the parameters of the demand function.

Assume that the parameters of the above demand function are known with certainty as shown below:

$$Q = -200P + 100P_A + 100Y + 40,000N - 5,00,000r + 500P_r \text{-----} (2)$$

Equation (2) indicates that automobile demand falls by 200 for each one rupee increase in the average price charged by the manufacturers; it rises by 100 with one rupee increase in the average price of substitutes; it increases by 100 for each one rupee increase in per capital income; it increases by 40,000 with each additional one crore persons in the population; it decreases by 5,00,000 for every 1% rise in interest rates; and it increases by 500 with each unit (one lakh rupees) spent on advertising.

#### The law of Demand:-

The purpose of the theory of demand is to establish the law of demand. The law of demand explains the behaviour of consumers, either a single consumer/household or all the consumers collectively. The law of demand states that:

–Other things remaining the same (ceteris parables), the quantity demanded of a commodity is inversely related to its price.

In other words, as price falls, the consumer buys more or the demand for a commodity falls when its price rises.

Thus,

1. The concept of demand generally refers to the quantity demanded at a given time, which may be a point of time, a day or a week.
2. The law of demand is based on the assumption that within the given time frame, there would be no change in the quantity of the good in question. To put it differently, among the various determinants of demand, the price of the commodity is the only variable.
3. The term –Ceteris parables associated with the law of demand, implies that taste and preferences, income, the prices of related goods, and social status, all remain constant over the period in which the impact of price variation on the quantity demanded is being analysed.
4. The law of demand is a partial analysis of the relationship between demand and price, in the sense that it relates to the demand for only one commodity, say X, at a time or over a period of time.

#### EXPLANATION OF THE LAW OF DEMAND:-

The law of demand can be well explained with the help of a –Demand schedule and a –Demand curve. The Demand schedule and a Demand curve can be drawn for an individual consumer, for a particular firm, as also for the entire industry.

#### DEMAND SCHEDULE:-

Demand schedule shows the list of prices and the corresponding quantities of a commodity. It is the tabular representation of the different combinations of price and the corresponding quantity demanded of a commodity. While preparing the Demand schedule, it is assumed that the marginal utility of money is constant and that the quantity demanded depends only on the price.

The following table gives one hypothetical Demand schedule for an individual consumer A, showing different price levels of a commodity that A is interested in and their corresponding quantities demanded by A, ceteris paribus.

TABLE-1

DEMAND SCHEDULE OF A

Prices(Rs)	Quantity demanded(in units)
10	20
8	30
6	40
4	50

It is seen from the table that when the price of the commodity is Rs 10 per unit, A purchases 20 units of the commodity. When the price falls to Rs 8, he purchases 30 units of the commodity. Similarly, when the price further falls, quantity demanded by A goes on rising.

DEMAND CURVE:-

The graphical presentation of the Demand schedule of any commodity is known as the DEMAND CURVE. The Demand schedule of any commodity can be converted into a demand curve when the various price-quantity combinations are graphically plotted.

The graph in fig.1 uses the numbers from the table-1 to illustrate the law of demand. By convention, the prices of the commodity is on the vertical axis and the quantities demanded is on the horizontal axis. The downward sloping line relating price and quantity demanded is called the DEMAND CURVE.

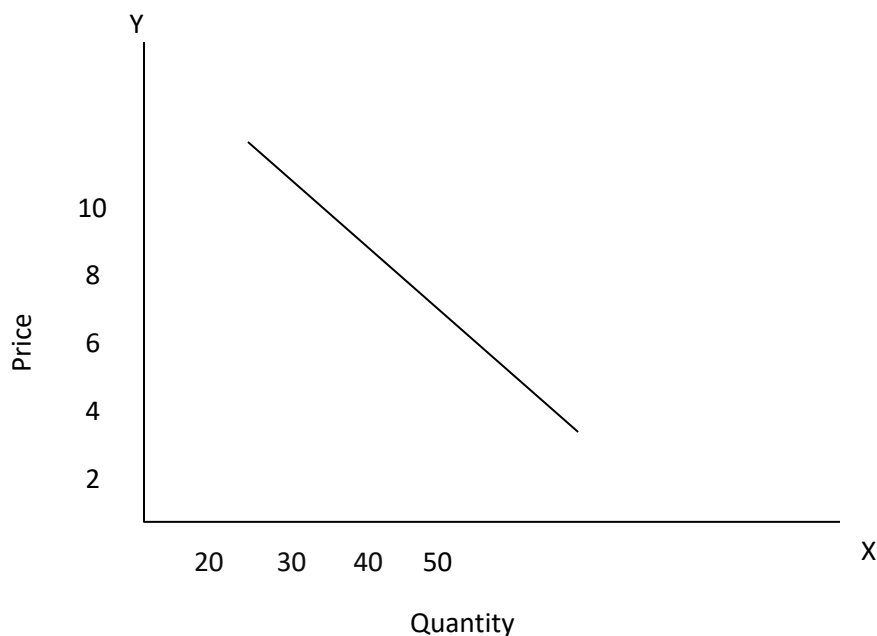


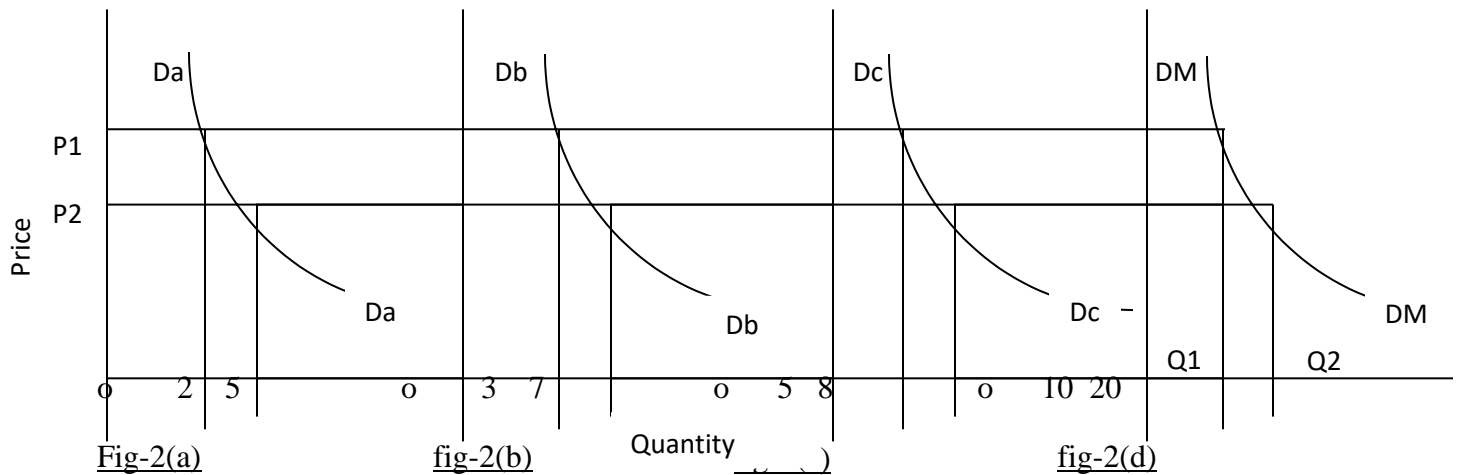
Fig-1

By plotting 20 units of the commodity against price Rs 10, we get a point in fig-1. Likewise, by plotting 30 units of the commodity demanded against price Rs 8, we get another point in fig-1. Similarly, other points are plotted representing other combinations of price and quantity demanded of the commodity and are shown in fig-1. By joining these various points, we get a curve DD, which is known as the Demand Curve. Thus, the Demand Curve is a graphic representation of quantities of a good which will be demanded by the consumer at various possible prices in a given period of time.

#### MARKET DEMAND CURVE:-

The quantity demanded in a market is the sum of the quantities demanded by all the buyers at each price. Thus, the market demand curve is found by adding horizontally the individual demand curves. In order to do so, we add the various quantities demanded by the number of consumers in the market. In this way, we can obtain the Market Demand Curve for the commodity which like the individual consumer's demand curve will slope downward to the right. How this summation is done is illustrated in the fig-2.

Suppose there are three individual(s) buyers of a good in the market. Fig-2(a), 2(b) and 2(c) show the demand curves of the three independent individual buyers. Now the Market Demand Curve can be obtained by adding together the amounts of the good(s) which individuals wish to buy at each price.



At price P1, the individual A wishes to buy 2 units of the good; individual B wishes to buy 3 units of the goods, individual C wishes to buy 5 units of the good. The total quantity of the good that the three individuals plan to buy at price P1 is therefore  $2+3+5=10$  which is equal to OQ1 in fig-2(a).

Now, as shall be seen from the figure at price OP2, individual A demands 5 units, individual B demands 7 units and individual C demands 8 units of the good. So, the market demand at the price OP2 of the good is  $5+7+8=20$  units or OQ2. When all the points showing the amounts demanded of the good by three individuals at various prices are joined, we get a market demand curve for the good. (DmDm as shown in fig-2(d)). For the sake of convenience we have supposed that there are Three individual buyers in the market for the good. Whatever be the number of individuals in the market, their demand curves can be added together to get a market demand curve for the good.

The market demand curve slopes downward to right, since the individual demand curves, whose lateral summation gives us the market demand curve, normally slope downward to the right. Besides, as the price of the good falls, it is very likely that the new buyers will enter the

market and will further raise the quantity demanded of the good. This is another reason why the market demand curve slopes downward to the right.

Why demand curve slopes downwards?:-

Demand curve shows the relation between price of a commodity and demand at that price, *ceteris paribus*. Let us now explore the reasons behind this fact, which can be well understood with the help of following points:

A) Law of diminishing marginal utility:-

The law of diminishing marginal utility implies that by increasing the stock of a commodity, its marginal utility is diminished. A consumer, who is assumed to be a rational one, always tries to seek maximum total utility when he buys goods. He is not willing to pay a price higher than the marginal utility in any case. Hence, the consumer would purchase only as many units of the commodity, where the marginal utility of the commodity is equal to its price and accordingly maximize his satisfaction. If price falls, the consumer will be motivated to demand more units of the commodity and vice-versa.

B) Substitution effect:-

When the price of a commodity falls, the consumer is induced to substitute more of the relatively cheaper commodity (one whose price has fallen) for the dearer one (whose price has remained unchanged). Because when the price of a commodity falls, the consumer's marginal utility for that commodity becomes comparatively high. Hence, to increase his total satisfaction he finds it worthwhile to purchase more of the cheaper commodity as against the dearer one. This is the most common psychological attitude of every consumer. Since, substitution effect is always positive, a larger quantity of the commodity will be purchased at a lower price and vice-versa.

C) Income effect:-

This refers to the changes in the real income of the consumer due to changes in price. Real income may be defined as total units of goods purchased with a given amount of money. When price of a particular commodity falls, the consumer's real income rises, though money income remains the same. Thus, with the fall in the price of the



commodity, the purchasing power of the real income of the consumer will rise, i.e. the consumer can now purchase the same amount of commodity with less money or he can now purchase more with the same money. The reverse also holds good.

Exceptions to the Law of demand:-

Although the law of demand is generally applied to all situations, yet there are a few number of cases where the law of demand does not hold good. These are referred to as exceptions to the law of demand. Some exceptions to the law of demand are explained below:

Giffen goods:-

Giffen goods are such goods which display direct price-demand relationship. These goods are considered inferior by the consumer, but they occupy a significant place in the individual's consumption basket. Sir Robert Giffen was the first who pointed out such situation. He observed that when the price of bread increased, the low-paid British workers in the early 19th century purchased more bread and not less of it. The reason given for this is that these British workers consumed a diet of mainly bread and when the price of bread went up, they were compelled to spend more on given quantity of bread. Therefore they couldn't afford to purchase as much meat as before. Thus, they substituted even bread for meat in order to maintain their intake of food.

Giffen goods categorically are those on which major portion of consumer's income is spent, hence they are termed as inferior. It is important to note that with the rise in the price of a Giffen good, its quantity demand increases and with the fall in its price its quantity demand decreases, hence the demand curve will slope upward to the right and not downward.

Bandwagon effect/Demonstration effect:-

In today's life, demand for certain goods sums to be determined basically not by their usefulness or utility but mostly on account of bandwagon effect or demonstration effect. When a person's behaviour is influenced by observing the behavior of other's activities, this is known as demonstration effect. Thus, demand in such cases is influenced by the consumption of trend setters (such as models, film stars, sports persons, group leaders, even friends and

neighbours) in the community. That means demand of an individual is conditioned by the consumption of others, hence the price becomes a minor consideration in this case.

In short, the bandwagon effect on market demand for a product is the result of the buyer's desire to be in style or fashion- that is, to have it because others have it. For example, desire or demand for wearing Jeans by girls has been influenced by the number of other girls purchasing and demanding Jeans.

The bandwagon effect tends to make the market demand curve flatter or more elastic than given by the simple horizontal summation of the individual demand curves.

Snob effect/Veblen effect:-

The snob effect refers to the desire of a person (usually the rich one) to own exclusive or unique product- called Snob good or Veblen good. Opposite to bandwagon effect, the snob effect can be described as the desire to purchase a commodity having prestige value so as to look different or exclusive than others. Such goods serve as a status symbol. The consumers of this particular commodity want to show it off to others, and as a result they buy less of it at lower prices and more at higher prices. The existence of snob effect tends to make the demand steeper or less elastic than indicated by the horizontal summation of individual demand curves. Thus, in the case of snob goods, price and quantity move in the same direction. Diamonds, an antique work of art, RayBan goggles, latest model of mobile phones, sports car like Ferrari etc. are examples of such goods. The snob effect is also referred to as Veblen effect, for the snobbish goods are sometimes also known as Veblen goods after the economist Thorstein Veblen. Veblen goods have snob value, for which the consumer measures the satisfaction derived not by their utility value, but by social status. In marketing and advertising strategies of such exclusive type of goods, demand has to be made effective by creating a snob effect.

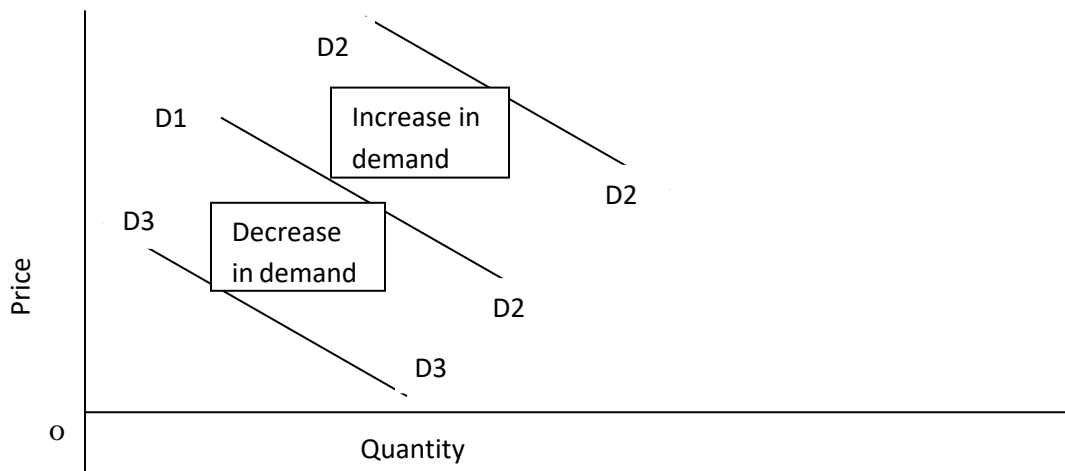
### SHIFTS IN THE DEMAND CURVE:-

The demand curve for a particular good shows how much of the good people buy at any given price that influence consumer's buying decisions. As a result, this demand curve need not be stable overtime. If something happens to alter the quantity demanded at any given price, the demand curve shifts.

So, when there is change in any other determinant of demand, price remaining unchanged, a new demand curve has to be drawn.

Any change that raises the quantity that buyers wish to purchase at a given price shifts the demand curve to the right. Any change that lowers the quantity that buyers wish to purchase at a given price shifts the demand curve to the left. Figure-3 illustrates the shifts in demand.

Fig-3



TABLE

<u>VARIABLE</u>	<u>A CHANGE IN THIS VARIABLE</u>
Prices	Represents a movement along the demand curve
Income	Shifts the demand curve
Prices of Related Goods	Shifts the demand curve
Tastes and preferences	Shifts the demand curve
Future Expectation	Shifts the demand curve
Number of Buyers	Shifts the demand curve

### CHANGED DEMAND and CHANGE IN DEMAND:-

Movement along the same demand curve is known as a contraction or expansion in quantity demanded i.e Changed Demand, which occurs due to rise or fall in the price of the commodity; where as a shift of demand curve due to a change in any of the factor other than price, such as income, tastes, or prices of related goods, is known as Change in Demand.

### Supply analysis:-

Any discussion on demand cannot be complete without understanding supply. Demand and supply are like two sides of a coin in the sense that both demand and supply helps in determining the price of a product in the market. Just as demand is the relation between the price and the quantity demanded of a product, supply is the relation between price and quantity supplied. Demand indicates the willingness of a purchaser to buy a particular commodity, where as supply means the willingness of the firms to sell a particular commodity.

### Meaning of supply:-

Supply is the amount of the goods or service, producers are willing and able to offer for sale at each possible price during a period of time, everything else held constant. Supply is a relative term. It is always referred to in relation to price and time. A statement of supply without reference to price and time conveys no economic sense.

Supply should be distinguished from the –Quantity supplied. –Quantity supplied is the amount of the good or service producers are willing and able to offer for sale at a specific price during a period of time, everything else held constant. Thus, the term supply refers to the entire relationship between the price of a commodity and the quantity supplied at various possible prices.

Two things are worth mentioning about the concept of supply. First, supply is a flow concept, that is, it refers to the amount of a commodity that the firms produce and offer for sale in the market per period of time, say a week, a month or a year. Without specifying the time period, supply of a commodity has a little meaning. Second, the quantity supplied of a commodity which the producers plan to produce and sell at a price is not necessarily the same as the quantity actually sold. Sometimes, the quantity which the firms are willing to produce and

sell at a price is greater than the quantity demanded, so the quantity actually bought and sold is less than the quantity supplied.

Supply and stock:-

The ability of a seller to supply a commodity, depends primarily on stock available with him. Thus, stock is the determinant of supply. Supply and stock are related but distinct terms:

- a) Supply comes out of the stock:- Supply is the amount of stock offered for sale at a given price. Thus, stock is the basis of supply. Without stock, supply is not possible.
- b) Stock determines the potential supply:- Actual supply, on the other hand, is the stock or quantity really offered for sale by the seller at a particular price during a certain period. Evidently, the limit to maximum supply, at a time is set by the given stock. Actual supply may be a part of the stock or the entire stock at the most. Thus, the stock can exceed supply, but supply cannot exceed the given stock, at any time.
- c) Stock is the outcome of production :- By increasing production, the stock can be increased, as well as the potential supply. Sometimes, increase in actual supply can exceed the increase in current stock, when along with the fresh stock, old accumulated stock is also released for sale at the prevailing price. Thus supply can exceed the current stock, but it can never exceed the total stock-old plus new stock taken together during a given period.

Determinants of supply:-

The supply of a product is largely determined by a number of factors, some of which are enumerated below:

A) The price of the commodity:-

Supply is positively related to the price of the commodity. With all the other factors remaining the same, if the price of the product rises, suppliers would find it profitable to sell more and vice-versa. Thus, price has a positive effect on quantity supplied.

B) Cost of Production:-

The cost of production of a commodity depends on the prices of the various factors of production. If the price of extensive factor(s) of production rises, the production costs would be higher for the same level of output. Conversely, a fall in the prices of a factor would reduce the cost of production. In both cases, the supply will be affected. When costs fall, supply will definitely be increased and when costs rise, supply will definitely be reduced.

C) State of technology:-

Technology bears a positive relationship with supply. Advances in technology reduces cost of production per unit of output, enhances productivity of factors of production and thus increases the supply of the product.

D) Government Policies:-

Government Policies are related to taxes and subsidies on certain products. A tax on a commodity or a factor of production raises its cost of production; consequently production is reduced and hence supply of the product. A subsidy, on the other hand, provides an incentive to production and augments supplies.

E) Exogenous Factors:-

Weather conditions, floods and droughts, epidemics, etc. do cause fluctuations in the supply of goods, particularly of agricultural goods. Fire, war, and earthquakes may destroy productive assets of a commodity and curtail future supplies.

Supply Function:-

The functional representation of the relationship between supply and its various determinants, is termed as supply function. In a supply function, Supply is the dependent variable and the determinants of supply are independent variable. The supply function of a commodity represents the quantity of the commodity that would be supplied at a price, levels of technology, input prices and all other factors that influence supply.

In a supply function, the determinants of supply can be supplied as under:

$$S_X = f(P_X, C, T, G, E) \text{-----} (1)$$

Where,  $S_X$  = The supply of commodity X

$P_X$  = The price of X

C = Cost of Production (wages, rent, interest, and prices of raw materials)

T = State of Technology

G = Government Policy regarding taxes and Subsidies.

E = Factors outside the Economic Sphere. (Exogenous factors)

A firm's supply function ( $S_X$ ) for a good X can be simplified by holding constant the values of all variables other than the price of the good, as follows:

$$S = f(P) \dots\dots\dots (2)$$

A linear Supply function is written in the form:

$$Q_s = a + bP \dots\dots\dots (3)$$

Where  $a > 0$ ,  $b > 0$

Here a and b are constants. The intercept -a represents the quantity supplied when the price is Zero. The slope -b measures the positive change in quantity supplied per unit increase in price.

The Law of Supply:-

The purpose of theory of supply is to establish the law of supply. The law of supply describes the seller's supply behavior under given conditions. The law reflects the general tendency of the sellers in offering their stock of a commodity for sale in relation to the varying prices.

Under the -Ceteris paribus assumption, the law of supply states that:

-Other things remaining the same, the higher the price of a commodity, the greater is the quantity supplied and vice-versa.

The formal statement of the law of supply consists of five phrases:

1. The quantity of well-defined good or service that
2. Producers are willing and able to offer for sale
3. During a particular period of time
4. Increases as the price of the good or service increases and decreases as the price decreases
5. Everything held constant.

Explanation of the Law of supply:-

The law of supply can be well explained and better understood with the help of –Supply Schedule and –Supply curve.

A supply schedule is a table or list of prices and corresponding quantities supplied of a particular good or service. In other words, the tabular representation of the different combinations of price and corresponding quantity supplied of a commodity, is known as the supply schedule of that particular commodity.

The following table presents the supply schedule for Tea. The schedule lists the quantities that the tea seller is willing and able to supply at each price, everything else held constant. As the price increases, the tea seller is willing and able to offer more tea for sale.

Table – 1

Supply Schedule

Price (Rs per cup)	Supply (—000 cups per week)
1	20
2	30
3	40
4	50
5	60



### Price and output determination

For demand and supply to determine price, a competitive situation must exist in the market. Competition is an ingredient in most markets which are not centrally planned. Competition, by definition, exists when no single economic agent, whether buyer or seller, can control the price in the market. This will occur when each agent's activities in the market make up only a small part of total market activities because many other agents are carrying out the same role. The new agents can enter the market at will if they feel there are profits to be made. Price is thus determined by the market as a whole. In theory each agent must simply accept that price. Ideally, the market would also be large enough to absorb whatever quantity of goods is traded by any single agent at the ruling price. Since, in perfect competition, it is upto the agent to decide the quantity traded, sellers and buyers are all quantity fixers and price takers. Each agent choose to trade that quantity which will maximize his/her profits and which he/she has resources to handle.

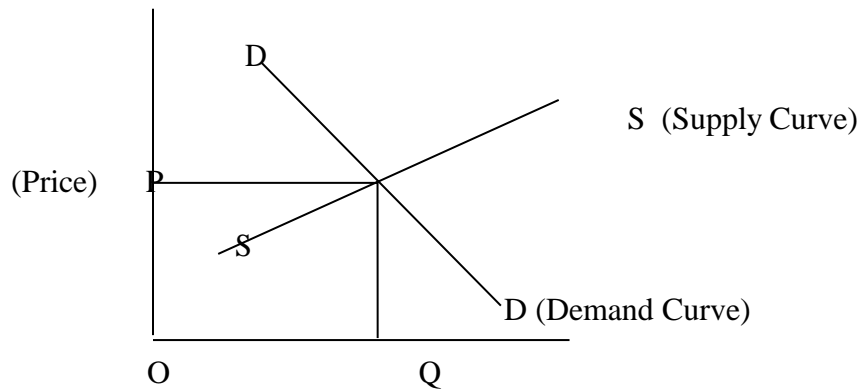
### Relationship between Demand and Supply:-

The relationship between demand and supply underlie the forces behind the allocation of resources. Supply and demand is perhaps one of the most fundamental concept of economics and it is the backbone of a market economy. In market economy theories, demand and supply theory will allocate resources in the most efficient way possible. Price is a reflection of supply and demand.

### Equilibrium:-

When supply and demand are equal (i.e. when the supply function and demand function intersect) the economy is said to be at equilibrium. At this point, the allocation of goods is at its most efficient because the amount of goods being supplied is exactly the same as the amount of goods being demanded. Thus, everyone (individuals, firms or countries) is satisfied with the current economic condition. At the given price, suppliers are selling all the goods that they have produced and consumers are getting all the goods that they are demanding.

Fig. :-



As you can see on the chart, equilibrium occurs at the intersection of the demand and supply curve, which indicates no allocative inefficiency. At this point, the price of the goods will be  $P$  and the quantity will be  $Q$ . this figure is referred to as equilibrium price and quantity.

In the Real market place, equilibrium can only be reached in theory. So the prices of goods and services are constantly changing in relation to fluctuations in demand and supply.

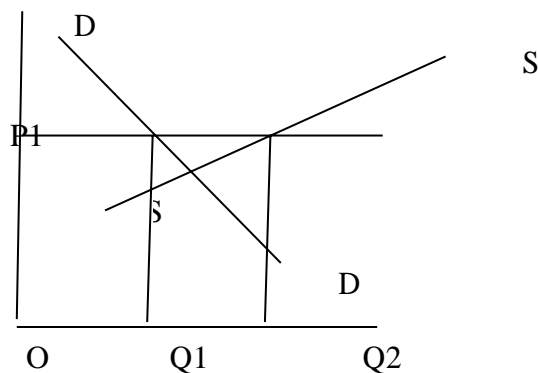
Disequilibrium:-

Disequilibrium occurs whenever the price of quantity is not equal to  $P$  or  $Q$ :-

#### 1. Excess supply :-

If the price is set too high, excess supply is created within the economy and there will be allocative inefficiency.

Fig :-



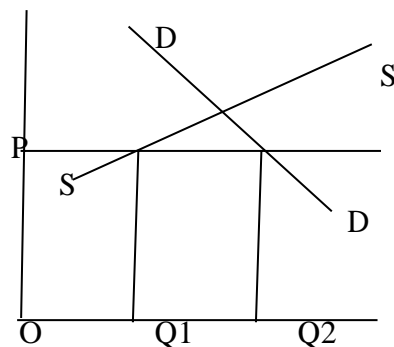
At the price  $P_1$  the quantity of goods that producers wish to supply indicated by  $Q_2$ . At  $P_1$ , however, the quantity that the consumers want to consume is at  $Q_1$  quantity much less than  $Q_2$ . Because  $Q_2$  is greater than  $Q_1$ , too much is being produced and too little is being consumed.

The suppliers are trying to produce more goods, which they hope to sell to increase profits but those consuming the goods will find the product less attractive and purchase less because the price is too high.

## 2. Excess Demand :-

Excess demand is created when price is set below the equilibrium price. Because the price is low, too many consumers want the good while producers are not making enough of it

Fig :-



In this situation, at price  $P_1$  the quantity of goods demanded by the consumers at this price is  $Q_2$ . Conversely the quantity of goods demanded by the consumers at the price is  $Q_2$ . Conversely the quantity of goods that producers are willing to produce at this price is  $Q_1$ . Thus, there are too few goods being produced to satisfy the wants (demand) of the consumers. However, as consumers have to compete with one other to buy the good at this price, the demand will push the price up making suppliers want to supply more and bringing the price closer to its equilibrium.

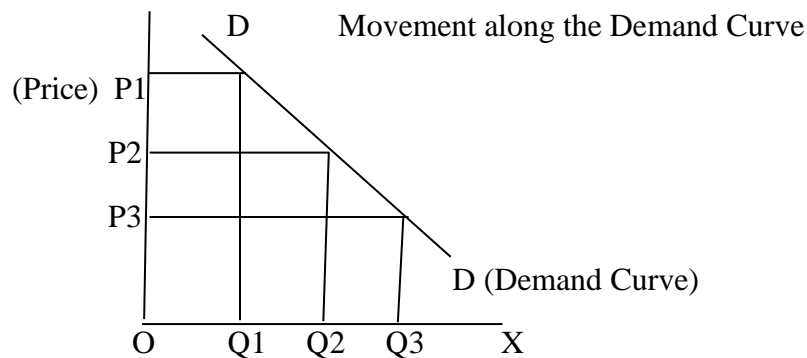
## Shifts Vs Movement

For economics movements and shifts in the relation to the supply and demand curves, represent very different market phenomena.

### 1. Movements

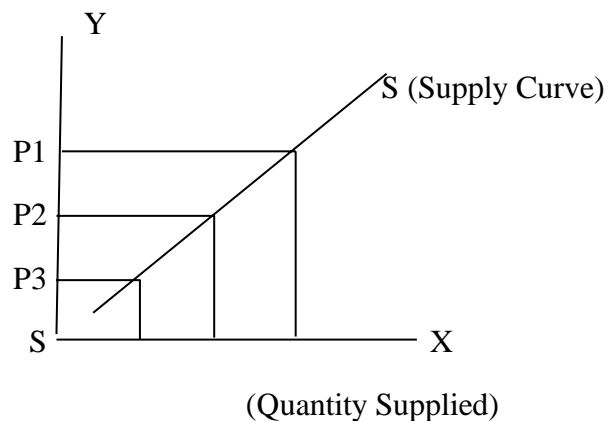
A movement refers to change along a curve on the demand curve, a movement denotes a change in both price and quantity demanded from one point to another on the curve. The movement implies that the demand relationship remains consistent. Therefore a movement along the demand curve will occur when the price of the good changes and the quantity demanded changes in accordance to the original demand relationship. In other words, a movement occurs when a change in the quantity demanded is caused only by a change in price and vice versa.

Fig :-



Like a movement along the demand curve, a movement along the supply curve means that the supply relationship remains consistent. Therefore, a movement along the supply curve will occur when the price of the good changes and the quantity supplied changes in accordance to the original supply relationship. In other words, a movement occurs when a change in quantity supplied is caused only by a change in price and vice versa.

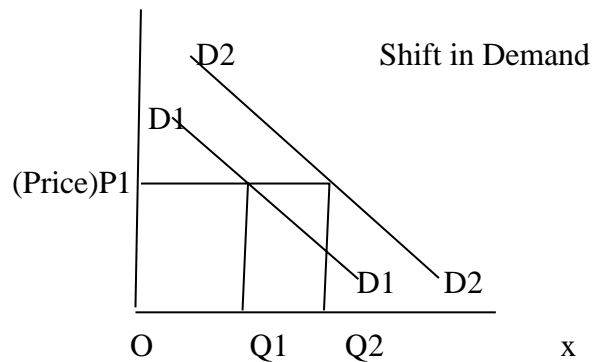
Fig :-



## 2. Shifts

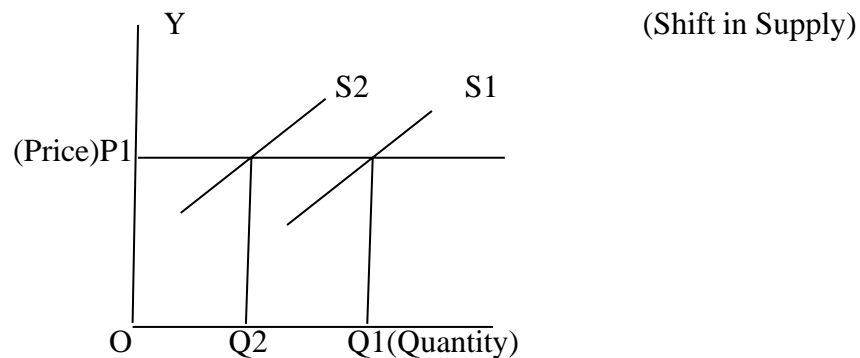
A shift in demand or supply curve occurs when a goods quantity demanded or supplied changes even though price remains the same. For instance, if the price for a bottle of milk was Rs 20 and the quantity of milk demanded increased from  $Q_1$  to  $Q_2$ , then there would be a shift in the demand for milk. Shifts in the demand curve imply that the original demand relationship has changed, meaning that quantity demanded is affected by a factor other than price.

Fig :-



Conversely if the price for a bottle of milk was Rs 20 and the quantity supplied decreased from  $Q_1$  to  $Q_2$ , then there would be a shift in the supply of milk. Like a shift in the demand curve, a shift in the supply curve implies that the original supply curve has changed, meaning that the quantity supplied is affected by a factor other than price. A shift in the supply curve would occur if, for instance a natural disaster caused a mass shortage of cows, milk producers would be forced to supply less milk for the same price.

Fig :-



## Elasticity of Demand:

Elasticity in general terms, refer to easy expansion or contraction of an object. Elasticity of demand (ED) is a technical term which helps in determining the magnitude of change in quantity demand for a rise or fall in the price of the product. It's a concept devised to indicate the degree of responsive of quantity demand of a product to the changes in the market price of the product. It depends primarily on the percentage changes and is independent of the units used to measure the quantity and price. Hence, the analysis of elasticity of demand helps the business firms in fixing prices for their products.

Types of Elasticity of demand: Basically, there are 3 types of elasticity of demand as follows:

- 1) Price elasticity of demand (PED)
- 2) Income elasticity of demand (IED)
- 3) Cross elasticity of demand (CED) i.e. ED for inter related goods.
  - A) Elasticity of substitution.
  - B) Complementary elasticity of demand.

## Price Elasticity of Demand

It means the responsiveness of quantity demand to changes in the price of the product, -Ceteris parables; it is the percentage change in quantity demand divided by a percentage in price

It is expressed as

$$\text{PED} = \frac{\frac{\frac{\Delta Q}{Q} \times 100}{\frac{\Delta P}{P} \times 100}}{1} = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = \frac{\Delta Q}{Q} \times \frac{P}{\Delta P} = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

It should be noted here that, since price and quantity are inversely related, the price elasticity of demand will always be negative. Thus the change in quality will in the opposite direction to the change in price. We usually ignore the negative sign and consider absolute values for price elasticity to ease understanding of the concept. The value of price elasticity varies between 0 and

$\infty$ , i.e.  $0 < PED < \infty$ . But in practice, the value of price elasticity of demand is always expressed in terms of one (1)

- i. If  $|P_{ED}| > 1$ , demand is elastic
- ii. If  $|P_{ED}| < 1$ , demand is inelastic
- iii. If  $|P_{ED}| = 1$ , demand is unitary elastic

In case (i), a given percentage change in price will result in an even greater percentage change in sales. In such a case, the sales are relatively responsive to price changes. Therefore the percentage change in quantity demand will be greater than the percentage change in price.

In case (ii) the percentage change in sales is less than a given percentage change in price. Demand is then said to be inelastic with respect to price.

In case (iii) a given percentage change in price results in an equal percentage change in sales. The absolute value of the coefficient of price elasticity is equal to one (1) in such cases.

Price elasticity can be of two types.

- 1) Point price elasticity
- 2) Arc price elasticity.

We use the point price elasticity to measure elasticity of demand numerically. In such case, the point on the demand curve after the change help in measurement of elasticity of demand. By use of this, minute changes in price are conveniently calculated.

But in case of Arc elasticity, we can measure elasticity of demand by finding average of price and quantity demand after and before change of it.

Point price elasticity can be denoted as  $-e_p$  and can be calculated as follows:

$$e_p = \frac{dQ}{dP} \times \frac{P}{Q}$$

Where, P: Original price

Q: Original Quantity demand

d: A change in

Arc price elasticity is denoted as  $E_p$  and can be calculated as follows:

$$E_p = \frac{\left( \frac{Q_1 - Q}{Q + Q_1} \right)}{\left( \frac{P_1 - P}{P + P_1} \right)} = \frac{\frac{Q_1 - Q}{Q + Q_1}}{\frac{P_1 - P}{P + P_1}} = \frac{Q_1 - Q}{Q + Q_1} \times \frac{P + P_1}{P_1 - P} = \frac{Q_1 - Q}{P_1 - P} \times \frac{P + P_1}{Q + Q_1}$$

Where P and Q are original price and quantity demand respectively; and P<sub>1</sub>, Q<sub>1</sub> are new price and new quantity demand.

Consider the hypothetical prices of some product and the corresponding quantity demand, as given below:

Demand schedule to demonstrate price elasticities

Price (P) in Rs.	Quantity (Q) (In units)	Ard Elasticity ( $E_p$ )	Point Elasticity ( $C_p$ )
90	40	$ -4.00 $	$ -9.00 $
70	120	$ -1.50 $	$ -2.33 $
50	200	$ -0.67 $	$ -1.00 $
30	280	$ -0.25 $	$ -0.43 $
10	360		$ -0.11 $



The algebraic equation for the demand schedule given above

$$P = 100 - .25 Q$$

$$Q = 400 - 4P$$

We can use this demand function to illustrate the determination of point price elasticities. Let's select the point at which  $P = 10$ , and  $Q = 360$

$$\text{Now, } e_p = \left| \frac{d_q P}{d_p Q} \right| = \left| \frac{80}{-20} \times \frac{10}{360} \right| = \left| -4 \times \frac{1}{36} \right| = \left| \frac{-1}{9} \right| = |-0.11|$$

Since  $|e_p| < 1$ , we could say that demand is inelastic at a price of Rs. 10/-. Now, consider a price of Rs. 70/-.

From the above table, it's seen that, at price of Rs. 70

$$|e_p| = |-2.33|$$

Since  $|e_p| > 1$ , demand is price elastic.

This example shows that the price elasticity of demand may (and usually does) vary along only demand function, depending on the portion of the function for which the elasticity is calculated.

It follows that we usually cannot make such statements as –The demand for product A is elastic, because it is likely to be elastic for one range of prices and in elastic for another usually at high prices. Intuitively, this is so because lowering price from very high levels is like to stimulated and much are compared to lowering prices when price is already low.

From the above demand schedule, we could calculate the Arc price elasticity between the two lowest prices i.e. between Rs. 30/- and Rs. 10/- as follows

$$|E_P| = \left| \frac{\frac{360 - 280}{10 - 30}}{\frac{360 + 280}{10 + 30}} \right| = \left| \frac{80}{640} \times \frac{40}{-20} \right| = \left| \frac{-4}{16} \right| = |-0.25|$$

The demand is inelastic in this range. This value of  $|E_P| = |-0.25|$  means that a 100% change in price results in a 25% change in quantity demanded (in the opposite direction of the price change) over this region of demand function. If we calculate the Arc price elasticity between the prices of 50 and 70, we have

$$|E_P| = \left| \frac{\frac{200 - 120}{50 - 70}}{\frac{200 + 120}{50 + 70}} \right| = \left| \frac{80}{320} \times \frac{120}{-20} \right| = \left| \frac{-6}{4} \right| = |-1.5|$$

We would say that demand is price elastic in this range because the percentage change in sales is greater than the percentage change in price.

Determinants of price Elasticity of demand:

In general three factors determine the price elasticity of demand. They are as follows :

#### 1) Availability of Substitutes:

The main determinant of elasticity is the availability of substitutes. Products for which there are good substitutes tend to have higher price elasticity of demand than products for which there are a few adequate substitutes. Movies are a good example. Movies are a form of recreation, but there are many alternative recreational activities. When ticket price at the movie theatre increases, these substitute activities replace movies. Thus, the demand for motion picture is relatively elastic. Thus, the product with close substitutes tends to have elastic demand; product with no close substitutes tends to have inelastic demand. An important mission for most advertising is to make the consumers perceive that no close substitute exists for the product being advertised, thereby rendering the consumers demand relatively inelastic.

## 2) Proportion of Income Spent:

Demand tends to be inelastic for goods, and services, that account for only a small proportion of total expenditure. Consider the demand for salt. 2 Kg of salt will meet the need, of typical household for months and costs only a few rupees. If the price of salt were to double, this change would not have a significant impact on the family's purchasing power. As a result, price changes have little effect on the household demand for salt. In contrast demand will tend to be more elastic for goods and services that require a substantial portion of total expenditures. Thus, demand for holiday travel, luxury cars take up a considerable portion of the family's budget and therefore tend to have higher elasticities. The relative necessity of a good also influences elasticity. For example, the demand for insulin is probably very inelastic because it is necessary for diabetics who rely on this drug.

## 3) Time period

Demand is usually more elastic in the long run than in the short run. The explanation is that, given more time, the consumer has more opportunities to adjust to changes in prices.

Information about the price elasticities can be extremely useful to managers as they contemplate pricing decisions, if demand is inelastic at the current price, a price decrease will result in a decrease in total revenue. Alternatively reducing the price of a product with elastic demand would cause revenue to increase. The effect on total revenue would be the reverse for a price increase. However, if demand is unitary elastic, price changes will not change total revenue. However, a price reduction is not always the correct strategy when demand is elastic. The decision must also take into account the impact on the Firm's costs and profits.

## Income Elasticity of Demand:

The income elasticity of demand measures the responsiveness of sales to change in income –*ceteris paribus*. It is defined as the percentage change in sales divided by the corresponding percentage change in income.

The methods used to calculate Arc income elasticity (EI) and point income elasticity (CI) are as follows:

$$E_I = \frac{Q_1 - Q}{I_1 - I} \times \frac{I_1 + I}{Q_1 + Q}$$

$$e_I = \frac{dQ}{dI} \times \frac{I}{Q}$$

Given information on sales and income, the calculation of income elasticities is strictly analogous to the calculation of price elasticities. If the income elasticity of demand for a product is greater than one (1), the product is said to be income elastic; if it is less than one, the product is income inelastic. For normal goods, the income elasticity is greater than 0 because with rising incomes, consumer will purchase a greater quantity of such goods, *Ceteris paribus*: If the income elasticity of demand for a product is negative, the good is an inferior good, that is people will choose to purchase less of the product when their income increase.

Normal goods are indicated by  $E_I$  or  $e_I > 0$

Inferior good, are indicated by  $E_I$  or  $e_I < 0$

If  $E_I$  or  $e_I > 1$ , the good is income elastic

If  $E_I$  or  $e_I < 1$ , the good is income inelastic

If  $E_I$  or  $e_I = 1$ , the good is unitarily income elastic

To illustrate just one way in which income elasticity may be useful, consider the following situation.

A Co. has obtained a fairly reliable estimate of the projected percentage increase in income for its market area for the next years, let's say 4.5%. Manager knows that sales are currently running at an annual rate of 200,000 units, and the marketing analysis group has estimated the Arc income elasticity of demand for the product at 1.2. If other factors are expected to remain relatively constant, we can use this information as one input into projecting sales for the next years, as follows:

$$E_I = \frac{\%dQ}{\%dI} \text{ , subsequently, } \%dQ = (E_I)(\%dI)$$

$$\Rightarrow \%dQ = (1.2)(4.5) \Rightarrow \%dQ = 5.4$$

Thus, next year's sales would be projected to be 5.4% above the current level, or 1.054 times this year's sales, i.e.

$$(1.054)(200000) = 210800 \text{ units}$$

Cross price elasticity:

The sales volume of one product may be influenced by the price of either substitute or complementary products. Cross price elasticity of demand provides a means to quantify that type of influence. It is defined as –The ratio of the percentage change in sales of one product to the percentage change in price of another product|| the Relevant Arc (Ec) and point (Cc) cross price elasticities are determined as follows:

$$E_C = \frac{Q_{b2} - Q_{b1}}{P_{a2} - P_{a1}} \times \frac{P_{a2} + P_{a1}}{Q_{b2} + Q_{b1}}, \text{ where}$$

$Q_{b1}$  : - original demand for product –b|

$Q_{b2}$  : - changed demand for –b||

$P_{a1}$  : - original price for product –a||

$P_{a2}$  : - changed price for product –a||

$$e_c = \frac{dQ_a}{dP_b} \times \frac{P_b}{Q_a}, \text{ where d: - a change in}$$

If a decrease in the price of product –a|| results in an increase in sales of product –b|| or vice-versa, we can conclude that the products are complementary to each other. So, in case of complementary products  $E_c$  or  $e_c < 0$ . Similarly, if an increase in the price of –a|| results in an

increase in sales of product –b|| or vice-versa, we can conclude that the products are substitutes to each other. So, in case of substitute products,  $E_c$  or  $e_c > 0$ .

Many large corporations produce several related products. Maruti produces many varieties of automobiles, Hindustan Lever produces many brand of soap and Gillete produces many types of razors. If Maruti reduces the price of its Alto Models, sales of its old warhorse the Maruti 800 may decline. When a company sells related products, knowledge of cross elasticities can aid decision makes in assessing such impact.

#### Demand Estimation:

The firm needs to have information about likely future demand in order to pursue optional pricing strategy. It can only charge a price that the market will bear if it is to sell the product. The more accurate information, the firm has, the less likely it is to take a decision which will have a negative impact on its operations and profitability. Demand estimation attempts to quantify the link between the level of demand and the variables which determine it. The basic methods which are used to estimate the demand function are:

- 1) Market experimentation
- 2) Survey of consumption intentions.
- 3) Regression Analysis

Market Experimentation methods consist of

#### (A) Actual Market method:

Under it, the consumers' reactions are observed with the help of sales outlets opened in different localities. These localities are chosen with a mix of customers with different levels of income, sex, age, education level etc. During the experiments, prices, advertisement and other controllable variable affecting demand are varied and customers' reactions are noted.

(B) Market simulation Method: Also known as consumer clinic or laboratory experiment technique, it involves giving a sum of money to each consumer with which he is asked to shop around in a simulated market. Consumer behaviour is then studies by varying the price and

quality of the good, its packaging advertisement etc. In survey of consumers' intentions method, consumers are contacted personally to disclose their future purchase plans. This may be attempted either by (i) census method, or (ii) sample method. In case of the former all consumers are contacted while in case of the latter only a few consumers out of the population are selected. The interview, are conducted either orally or through questionnaire.

With the help of the census method (also known as complete enumeration method), the probable demand to all the consumers is summed up. This method has an advantage of giving first hand and unbiased information.

Under the sample survey method, the forecasted demand for the sample unit is blown up to find the total demand in the market. This is done by multiplying the sample results by the ratio of the or results of the sample demands upon the representatives ness of the sample to the population.

A variant of the survey technique is test marketing this is done mainly for estimating demand of new products of estimating sales potential of existing products in new geographical areas. In this method, a test area is selected which truly represents the market. The product is launched in this are exactly in the manner in which it is intended to be launched in the market. If the product is found successful in the test area then the sales are taken as a basis for estimating sales in the market as a whole.

Regression Analysis is a statistical technique by which demand is estimated with the help of certain independent variables (like income price of the commodity, price of related goods, advertisement etc.)

Simple regression analysis is used when the quantity demanded is taken as a function of single independent variable multiple regression analysis is used to estimate demand as a function of two or more independent variables that vary simultaneously.

The regression method involves five steps:

- 1) Identifying demand function for the commodity i.e. selecting the variables which are expected to influence the demand for the product.
- 2) Collecting historical data on all the selected variables

- 3) To select an appropriate functional form for estimation
- 4) Estimation of the selected demand function.
- 5) Analysing the estimated demand function and suggesting the marketing policy.

#### Demand forecasting:

Demand forecasting is a prediction or estimation of the future demand. It tries to find out expected future sales level, given the present state of demand determinants. Forecasts can be physical as well as financial in nature, and are used mostly for planning purposes. All firms need to forecast their sales, but it is not possible to forecast them exactly. The best the firms can do is to obtain their forecasting as precisely as possible. Forecast can broadly be classified into two categories.

**Passive Forecasts:** Where prediction about future is based on the assumption that the firm does not change the course of its action.

**Active Forecasts:** Where forecasting is done under the condition of likely future changes in the action by the firm.

Generally, business firms are interested in passive and active forecasts often they predict sales after taking into account change in a host of policy variables like prices of substitutes and complements, design, quality, advertisement expenditure etc.

Forecasting is done both for the long run as well as short run.

In a short run forecast, seasonal patterns are of prime importance such a forecast help in preparing suitable sales policy and proper scheduling of output in order to avoid over – stocking or cost delay in meeting the orders. Besides, given an idea of likely demand short run forecasts also help in arriving at suitable price for the product and in deciding about necessary modifications in advertising and sales techniques. Short run forecasts are needed to evolve suitable production policy, controlling inventory and cost of raw materials, determining suitable price policy, setting sales targets and planning future financial requirements.



Long run forecasts are helpful in proper capital planning .Long term help in saving the wastages in raw materials, man-hours, variables like population, age group pattern, consumption pattern etc. are included.

Long run forecasting usually used for –new unit planning, expansion of the existing units, planning long run financial requirements and non-power requirements.

The following steps are necessary to have an efficient forecast of demand:

- 1) Identification of objective
- 2) Determining the nature of goods under consideration
- 3) Selecting a proper method of forecasting
- 4) Interpretation of Results

Methods of demand forecasting:

There is no easy method or a simple formula which enables the manager to predict the uncertainties of future and escape the hard process of thinking. There are various forecasting techniques, varying in terms of their accuracy and sophistication. The critical problem is to choose the most efficient technique given the objective of forecast, nature of available information and the availability of finance and expertise.

Fundamentally, there are two approaches to the problem of business forecasting:

1. To obtain information about the intentions of consumers by means of market research, survey, economic intelligence etc.
2. To use past experience as a guide and by extrapolating past trend to estimate the level of future demand.

The first method tends to be used for short-run forecasting; while the second method is suitable for long-run forecasting.

Demand for established product, therefore, may be forecasted by two broad methods:

- 1) Opinion Polling Method
- 2) Statistical Method

Opinion polling method can be of three types:-

- a) Consumer's Survey Method
- b) Sales Force Opinion Method
- c) Expert's Opinion Method

Consumer's Survey Method is further of three types:

- i. Complete Enumeration Survey
- ii. Sample Survey and Test Marketing
- iii. End use

Statistical Methods can be of four types:

- a. Mechanical Extrapolation or Trend Projection Method
- b. Barometric Techniques
- c. Regression Method
- d. Simultaneous Equation Method

Trend projection method refers to the -Time Series Analysis which can be done through:

- I. Fitting trend line by observation
- II. Least Squares linear regression
- III. Moving Average and Annual Difference
- IV. Exponential Smoothing
- V. ARIMA (Auto Regressive Integrated Moving Averages) Method

## LEARNING OUTCOMES

### 1 Explain how the law of demand affects market activity

Demand is a relationship between the price of a product and the quantity consumers are willing and able to buy per period, other things constant. According to the law of demand, quantity demanded varies negatively, or inversely, with the price. A demand curve slopes downward because a price decrease makes consumers (a) more willing to substitute this good for other goods and (b) more able to buy the good because the lower price increases real income.

### 2 Explain how the law of supply affects market activity

Supply is a relationship between the price of a good and the quantity producers are willing and able to sell per period, other things constant. According to the law of supply, price and quantity supplied are usually positively, or directly, related, so the supply curve typically slopes upward.

The supply curve slopes upward because higher prices make producers (a) more willing to supply this good rather than supply other goods that use the same resources and (b) more able to cover the higher marginal cost associated with greater output rates.

### 3 Describe how the interaction between supply and demand create markets

Demand and supply come together in the market for the good. A market provides information about the price, quantity, and quality of the good. In doing so, a market reduces the transaction costs of exchange—the costs of time and information required for buyers and sellers to make a deal. The interaction of demand and supply guides resources and products to their highest-valued use.

### 4 Describe how markets reach equilibrium

Impersonal market forces reconcile the personal and independent plans of buyers and sellers. Market equilibrium, once established, will continue unless there is a change in a determinant that shapes demand or supply.

### 5 Explain how markets react during periods of disequilibrium.

Disequilibrium is usually temporary while markets seek equilibrium, but sometimes disequilibrium lasts a while, such as when government regulates the price.

### 6. Define and graph the price elasticity of demand

The price elasticities of demand and supply show how responsive buyers and sellers are to changes in the price of a good. More elastic means more responsive. When the percentage change in quantity demanded exceeds the percentage change in price, demand is price elastic. If demand is price elastic, a price increase reduces total revenue and a price decrease increases total revenue. When the percentage change in quantity demanded is less than the percentage change in price, demand is price inelastic. If demand is price inelastic, a higher price increases total revenue and a lower price reduces total revenue. When the percentage change in quantity demanded equals the percentage change in price, demand is unit elastic; a price change does not affect total revenue.

### 7 Identify the determinants of the price elasticity of demand

Demand is more elastic (a) the greater the availability of substitutes; (b) the more narrowly the good is defined; (c) the larger the share of the consumer's budget spent on the good; and (d) the longer the time period consumers have to adjust to a change in price.

### 8 Define and graph the price elasticity of supply

The price elasticity of supply measures the responsiveness of quantity supplied to price changes. Price elasticity of supply depends on how much the marginal cost of production changes as

output changes. If marginal cost rises sharply as output expands, quantity supplied is less responsive to price increases and is thus less elastic. Also, the longer the time period producers have to adjust to price changes, the more elastic the supply.

#### 9 Describe other measures of elasticity

Income elasticity of demand measures the responsiveness of demand to changes in consumer income. Income elasticity is positive for normal goods and negative for inferior goods. The cross-price elasticity of demand measures the impact of a change in the price of one good on the demand for another good. Two goods are defined as substitutes, complements, or unrelated, depending on whether their cross-price elasticity of demand is positive, negative, or zero, respectively.

#### Numerical Problems (Theory of Demand and Supply)

1. Given the following market demand function for the commodity –A||.

$$Q_A = f ( P_A, P_B, P_C, I, T, A_d )$$

Where,  $P_A$  = Price of the commodity A

$P_B$  = Price of a substitute commodity B

$P_C$  = Price of commodity C which is complement of A

$I$  = Level of per capital income of consumers

$T$  = Tastes and Preferences of consumers

$A_d$  = Advertisement expenditure by a firm producing A

How will the consumer demand for commodity A change?

- I. If the price of the commodity A rises,
  - II. If the price of the substitute good B rises,
  - III. If the price of commodity C rises,
  - IV. Per capital income(I) of the consumer rises,
  - V. The firm producing A increases its advertisement expenditure.
2. The demand for apples in a small town was 200 kg when the price was Rs 20 per kg. It expanded to 250 kg. When the price was reduced to Rs 18 per kg. What is the elasticity of demand for apples in the town?

3. For each of the following equations, determine whether demand is elastic, inelastic or unitary elastic at the given price:
  - a)  $Q = 100 - 4P$  and  $P = \text{Rs } 20$
  - b)  $Q = 1500 - 20P$  and  $P = \text{Rs } 5$
  - c)  $P = 50 - 0.1Q$  and  $P = \text{Rs } 20$
4. A consumer purchases 80 units of a commodity when its price is Rs 1 per unit and purchases 48 units when its price rises to Rs 2 per unit. What is the price elasticity of demand for the commodity? [Ans.  $e_P = 0.75$ ]
5. The price elasticity of demand of colour TVs is estimated to be -2.5. If the price of colour TVs is reduced by 20 percent how much percentage increase in the quantity of colour TVs sold do you expect? [Ans. 50 Percent]
6. Suppose that your demand schedule for T-Shirts is as follows:

Price (in Rupees)	Quantity Demanded (income = Rs 12,000)	Quantity Demanded (income = Rs 15,000)
5	20	25
8	16	22
11	12	19
14	8	16
17	4	13

- a) Use the mid point method to calculate your price elasticity of demand as the price of T-Shirts increases from Rs 5 to Rs 8 if (i) Your income is Rs 12,000 and (ii) If your income is Rs 15,000
  - b) Calculate your income elasticity of demand as your income rises from Rs 12,000 to Rs 15,000 if (i) the price is Rs 14 and (ii) the price is Rs 17.
7. Two goods have cross elasticity of demand equal to 1.2.
  - a) Would you describe the two goods as substitutes or complements?
  - b) If the price of one of the goods rises by 5 percent, what will happen to the demand for the other good, holding other factors constant?
8. After a careful statistical analysis, Tasty Burgers of Mumbai concludes that the demand function for its burgers is  $Q = 500 - 3P + 2P_1 + 0.1Y$ , where  $Q$  = Quantity demanded of

its burgers,  $P$  = Price of its burgers,  $P_i$  = Price of burgers of Jumbo Burgers (the closest rival of Tasty Burgers),  $Y$  = Disposable income of consumers of Mumbai. In the Year 2009,  $P = \text{Rs } 10$ ;  $P_i = \text{Rs } 20$ ;  $Y = \text{Rs } 6000$

- What is the price elasticity for the burgers of Tasty Burgers?
- What is the income elasticity for the burgers of Tasty Burgers?
- What is the cross elasticity of demand between the burgers of Tasty Burgers and Jumbo Burgers? [Ans. (a)  $e_P = 0.027$ , (b)  $e_P = 0.5405$ , (c)  $e_C = 0.0360$ ]

- Using the following schedule, define the equilibrium price and quantity. Describe the situation at a price of Rs 10. What will occur? Describe the situation at a price of Rs 2, what will occur?

Price (in Rs)	Quantity demanded $Q_d$	Quantity Supplied $Q_s$
1	500	100
2	400	120
3	350	150
4	320	200
5	300	300
6	275	410
7	260	500
8	230	650
9	200	800
10	150	975

- There are 1,000 identical individuals in the market for commodity X given by  $Q_{dX} = 12,000 - 2,000P_X$ , ceteris paribus and 100 identical producers of commodity X, each with a function given by  $Q_{sX} = 2,000P_X$ , ceteris paribus.

- Find the equilibrium price and quantity
- If there is an increase in consumer's income  $Q_{dX} = 14,000 - 2,000P_X$ , derive the new market demand schedule and state the new equilibrium price and quantity.

- III. Suppose there is an improvement in the technology of producing commodity, the new market function is  $Q_{SX} = 4,000 + 2,000P_X$ . derive the new market schedule and state the new equilibrium price and quantity.

11. Suppose the following demand function for coffee in terms of price of Tea is given. Find out the cross elasticity of demand and when the price of Tea rises from Rs 50 per 250 g pack to Rs 55 per pack.

$$Q = 100 + 2.5P_t$$

Where Q is quantity demanded of coffee in terms of 250 g and  $P_t$  is the price of tea per 250 g pack.

12. Colgate sells its standard size toothpaste for Rs 25. Its sales have been on an average 8000 units per month over the last year. Recently its close competitor Pepsodent reduced the price of its same standard size toothpaste from Rs 35 to Rs 30. As a result, Colgate sales declined by 1500 units per month.

- I. Calculate the cross elasticity between the two products.
- II. What does your estimate indicate about the relationship between the two.

13. Initial supply of commodity X at price Rs 25 is 10,000 Kgs. At price Rs 30, the seller offered to sale 12 p.c. more. Is the supply highly elastic?

14. Assume that the average price of a new model of Maruti car in Delhi is Rs 4,60,000 and 90,000 cars are sold out at this price in a year. If the price elasticity of demand for new cars is Rs 1.7 what will be the effect on annual sales when the average price of this new model declines to Rs 4,15,000.

15. Estimate the elasticity of supply at price Rs 20 per unit of the commodity, given the supply function:

$$Q_S = 90 + 15P$$

16. Suppose the demand curve for a product is given by:

$$Q = 10 - 2P + P_S$$

Where  $P$  is the price of the product and  $P_s$  is the price of the substitute good. The price of the substitute good is Rs 20.

- a) Suppose  $P = \text{Rs } 10$ , what is the price elasticity of demand? What is the cross-price elasticity of demand?
  - b) Suppose the price of the product,  $P$ , declines to Rs 5. Now what is the price elasticity of demand? What is the cross-price elasticity of demand?
17. A consumer spends all his income on two goods X and Y. If a 50 p.c. increase in the price of good X doesn't change the amount consumed of good Y, what is the price elasticity demand for good X?
18. The price elasticity of demand for two wheelers is -2.2. If the price is slashed by 10 p.c., what would be the expected increase in the quantity sold?
19. Samsung pvt. Ltd. Is planning to reduce the price of its refrigerators by 10%. It is also expected that disposable income will increase by 6% during the same period. The price and income elasticity are estimated to be -1.3 and 2.0, respectively. Currently Samsung is selling 2,00,000 pieces per year. How much can Samsung hope to sell after the above changes in price and income?
20. Vijay Dairy is selling flavoured milk and buttermilk in packets of 150 ml. The dairy sells 2000 packets of flavoured milk and 1000 packets of buttermilk everyday. The former is priced at Rs 6 and the latter at Rs 4. A market survey estimates the cross-price elasticity (both ways) to be +1.8, and the own price elasticity of flavoured milk to be -1.3. The dairy is contemplating a 10% reduction in the price of flavoured milk. Should it go ahead with the price reduction? Show your working.

#### QUIZ TEST

- The law of demand says that as the price of a good rises,
  - a) Buyers recognize that price may be even higher in the future, and so they buy now.
  - b) Buyers purchase less in hopes that the price will fall in the future
  - c) Buyers purchase less in part because their real income has fallen
  - d) Buyers purchase more in part because the price of a substitute has risen.



- Movements along a demand curve are called changes in
  - a) Demand
  - b) Opportunity costs
  - c) Quantity demanded
  - d) The substitution effect
- Which of the followings will not shift the demand curve for movie tickets?
  - a) A change in the cost of babysitting services
  - b) A change in the price of movie tickets
  - c) A change in the quality of television programmes
  - d) A change in the income of movie-goers.
- The difference between normal and inferior goods is that
  - a) Normal goods are of better quality than inferior goods
  - b) An increase in price will shift the demand curve for a normal good rightward and the demand curve for an inferior good leftward
  - c) If the price of a normal good increases individuals who buy it are poorer, for inferior goods, the opposite is true
  - d) An increase in income will shift the demand curve for a normal good rightward and the demand curve for an inferior good leftward.
- An increase in the demand for peanut butter could be caused by a (n)
  - a) Decrease in consumer income
  - b) Increase in the supply of peanut butter
  - c) Decrease in the price of bread
  - d) Drought in India that destroyed 30 percent of the peanut crop.
- Supply curves generally slope upward because of all of the following reasons except one. Which is the exception?

- a) Producers are willing to offer more of a good at high prices
  - b) A higher price attracts resources from less valued uses
  - c) Producers must be compensated for the rising opportunity cost of additional output
  - d) The price of a good usually must fall to induce an increase in quantity supplied.
- Which of the following is the reason supply curves typically slope upward?
    - a) Opportunity cost of production increases as quantity supplied increases
    - b) Supply increases as opportunity cost decreases
    - c) Price increases as supply decreases
    - d) Quantity supplied is unrelated to price
- If the supply curves for the following goods were plotted, they all would slope upward except one. Which is the exception?
    - a) Red corvettes
    - b) Yogurt
    - c) Diamond rings
    - d) original copies of the Monalisa
- Saccharin and Aspartame are both low-calorie substitutes for sugar. If saccharin is found to cause cancer
    - a) The price of Aspartame will increase
    - b) The price of sugar will decrease
    - c) The price of saccharin will increase
    - d) The demand curves for Aspartame and sugar will shift leftwards.
- Suppose a market is in equilibrium and then a price floor is established below the equilibrium price. Which of the following will happen?
    - a) Quantity demand will increase
    - b) A surplus will develop

- c) A shortage will develop
- d) The market will remain in equilibrium.

### Case study – I

Our country occupies a place of pride in the world, when it comes to higher education. Be it in the field of engineering (IITs), medicine (AIIMS) or management (IIMs) education comes at a much lower price than in a country like the US. We may, therefore, say that we are indeed a socialistic country where education and a few other things are concerned.

However, the recent trend of privatization initially meant for the industrial sector has spread its wings to core social sectors like education, especially higher education. The University Grants Commission (UGC), the apex body that gives grants to various universities and colleges associated with it, heavily subsidizes the cost of education. Of late, the UGC has been saying that the burden of subsidy has to be reduced for which, colleges have to hike their fees and quality education will in future, come at quality price.

Many colleges reacted negatively to this decision of the UGC. Saraswati College was of them. The managing committee of the college in discussion with the principal and the patrons decided, if the same quality of education had to be maintained, the fees of the students had to be increased on an average by 75 per cent, i.e. General Science students who were earlier paying Rs 500, would now have to pay Rs 875 per month. To top it, there was to be an annual maintenance fee of Rs 1,500 towards the maintenance of the library and laboratory. This on a monthly basis amounted to a 100 per cent hike in the fee structure, which pinched middle-class parents' pockets. Most students, therefore, wanted the college to continue with its old fee structure.

In a meeting between the students' union and the managing committee, student leaders protested by arguing that most of them could not afford to pay more than what they were already paying. The main argument put forward by the principal was, there had to be a fee hike with reduction in the UGC grant to prevent reduction of facilities and faculty. The principal also argued that with increased revenue, the college could start new popular courses like insurance, financial journalism, etc., which would enhance the reputation of the college. The

faculty, partly because the fee hike meant a probable hike in their salaries and partly as a pro-management policy, were in favour of the new fee structure, more so, because the new situation would not lead to a loss of jobs for some of them.

Unfortunately, students could not gather the much-required support from any quarter and the initial momentum declined. During the lull, a group of students of managerial economic came up with a brilliant idea. They knew that the whole argument put forward by the management and the college principal was that a hiked fee would result in hiked revenue a much-needed resource. This group of students studied the fee structure for all the subjects carefully and also made a study of all the colleges in that area. They found that on an average, whenever the college committee had hiked the fee of any course (except commerce, economics and management), there had been a decrease in the number of students (the students had either moved to other courses or colleges).

Further investigation showed that students from all course could be divided into three broad groups—Group 1 consisting of commerce, economics and management, Group 2 consisting of English, mathematical statistics, mathematics and applied psychology and Group 3 consisting of all other subjects. They found that Group 1 students did not show much inclination towards leaving their course even when the fees were hiked. Group 2 students showed more of an inclination to leave if the fees were hiked. The question was, would the Group 3 students continue despite a fee hike? The answer to this was to decide the fate of the student's agitation. The Group 3 consisted of 60 per cent of the students in the college who were 'fee sensitive' and showed a positive correlation with the 'economical' courses being offered in the college. One of the possible reasons could have been that the majority of the courses taken up by the Group 3 students were applied and the average fee for these were higher than the others.

Since a majority of the students were in Group 3, it was studied further. It was found that 2,000 students were currently enrolled in that group at the given fee structure, but that there would be a 1.2 per cent fall in the enrolment number with every 1 per cent hike in the fee. The students

calculated that the total revenue earned would actually fall with the increasing in fee structure and will outweigh the increase in revenue (with the increase in the fee) from Group 1. they could thus convince the college authorities that the college will be a loser if there was a general fee hike.

#### QUESTIONS FOR DISCUSSION

1. Assuming that the students are consumers availing of educational service, how will you differentiate between the behaviours of the Group 1, Group 2 and Group 3 consumers?

Hint: Explain in terms of elasticity.

2. Explain the law of demand that the managerial economics students were talking about to stop the fee hike.
3. Can you think of certain arguments in the case study which the college authority could pick up to counter-argue with the students?
4. If the Group 2 students (400 in number) are 'neutral to the fee hike' and for every 5 per cent hike in fees 2 per cent students leave the Group 1 course (which has 400 students), find out how much the revenue loss to the college will be with the proposed fee hike.

## CASE-II

### Demand Function in the Indian Auto Industry

In an economy, growing with the rapid growth of the middle class, the consumption of consumer durables is an indicator of the level of urbanization, modernization and lifestyle. The purchase of automobiles, one of the most significant consumer durables, is an important indicator of consumer buying behaviour. Moreover, the contribution of auto-industry to the GNP has been increasing steadily ever since the sector had been delicensed in 1993. This adds around 3 to 5 per cent to the GNP. The size of the passenger car is about 4 lakh at present, which is miniscule when compared to the US, Europe or the Japanese market. The verdict, there is immense potentiality in this market, grab the opportunity. Global car manufactures are paying heed to it and have flocked to the country. But in order to establish themselves, they have specific tastes, preferences and other generic demand determinants. We will start our discussion with the greatly untapped market—the non-urban car market in India, which contrary to popular belief, has potential.

To begin with, since cars are still a high-priced commodity (although the Maruti 800 has changed this perception), the level of income is presumably the most important determinant. More appropriately, per capita real GNP itself. Given that inflation is more or less under control, which in turn is because of the active support to agriculture by the government which sets floor prices for agricultural products and gives huge amounts of subsidies to buy fertilizers and electricity, making the non-urban sector a big, potential market. There has been a huge increase in the real per capita non-urban (specifically non-metro) income. Non-urban society thus becomes the next potential market for car manufacturers after the urban metros. But can we treat the whole non-urban/no-metro society as a uniform group exhibiting a similar kind of demand in the market? Certainly not, because the non-urban area is divided into rich farmers, plantation owners and absentee landlords who have diversified into other kinds of businesses, including exports. All three groups will form potential buyers for the passenger car. Thus we get the first kind of market segment, on the basis of income group, and within the segment the sub-segment, i.e. from where the income is generated, rural or urban area, local or global market, income is generated, rural or urban area, local global market. Logically, buying behaviour in terms of attitudes towards the price or price sensitivity, brand-consciousness and

taste will be different for non-urban buyers when compared to their urban and metro counterparts.

Car manufactures have already divided the car market on the basis of income. There are cars in the economy segment, mid-segment premium segment, within the mid-segment, one can find a lower mid-segment, comprising of the Maruti 1000 and the upper mid-segment, comprising of the Accent and Ikon. The premium segment is likewise, divided into the luxury segment and super-premium segment. But the kind of car to be purchased within that segment depends on other determinants. Let us take the case of a rich sugar farmer from UP. He might have the same purchasing power as that of an urban upper middleclass man, but may not prefer a delicate car like the Maruti, because of bad road conditions in his village. Further market research proves that people from semi-and non-urban India envisage heavy-looking, brightly coloured goods as a sign of strength, durability and sturdiness. Thus, the demand with the same purchasing power will be entirely different.

The next crucial question is, how price sensitive are the buyers? Here the approach that has to be followed will vary greatly between urban and non-urban areas. Generally speaking, the demand is going to be elastic since cars are still considered luxury items, especially in small towns and rural areas. Heavy advertising and easier B2C communication in urban areas are helping auto-manufacturers develop a brand image easily, educating the customer on brand equity and acquiring brand loyalty. We all know that price sensitivity and brand loyalty are negatively related. Thus, an urban buyer tends to be less price sensitive. In the metros, other related factors like a busy lifestyle, makes depending on the unreliable public transport system a strictly avoidable situation. This makes the metro buyers price-insensitive as a car is treated more like an essential commodity. Non-urban buyers in general, tend to be less brand conscious (unless the brand becomes a logo for them—which is possible only in the long term) and more value-conscious. Further, in the cities one finds an equal number of women drivers who prefer delicate-looking cars.

Hence we see that the law of demand, which states that there is an inverse relation between price and quantity demanded, *ceteris paribus* (other things remaining constant), need not always be true. The reason being that price itself becomes a function of lifestyle. The law of demand can be true once the market segment is clearly defined.



Studying the demand pattern of the buyers for proper positioning of the car and gaining market share becomes more important as the supply of the passenger car, ever since the sector has been deregularized, has far outstripped the actual demand for cars making this a ‘buyer’s market’.

#### QUESTIONS FOR DISCUSSION

1. Discuss in detail the various determinants of demand for passenger cars in India.
2. What role does non-urban India play in forming the demand in the auto-market?
3. Do you agree that the law of demand, technically speaking, cannot work in an auto-maker? Justify your answer.
4. Imagine that you are a new global auto maker planning to enter the Indian market. List the various demand aspects you think are important. Prioritize them and explain for the prioritization plan that you follow.

## **MODULE-4: MACRO ECONOMICS VARIABLES**

### **Macro Economic policies – An overview**

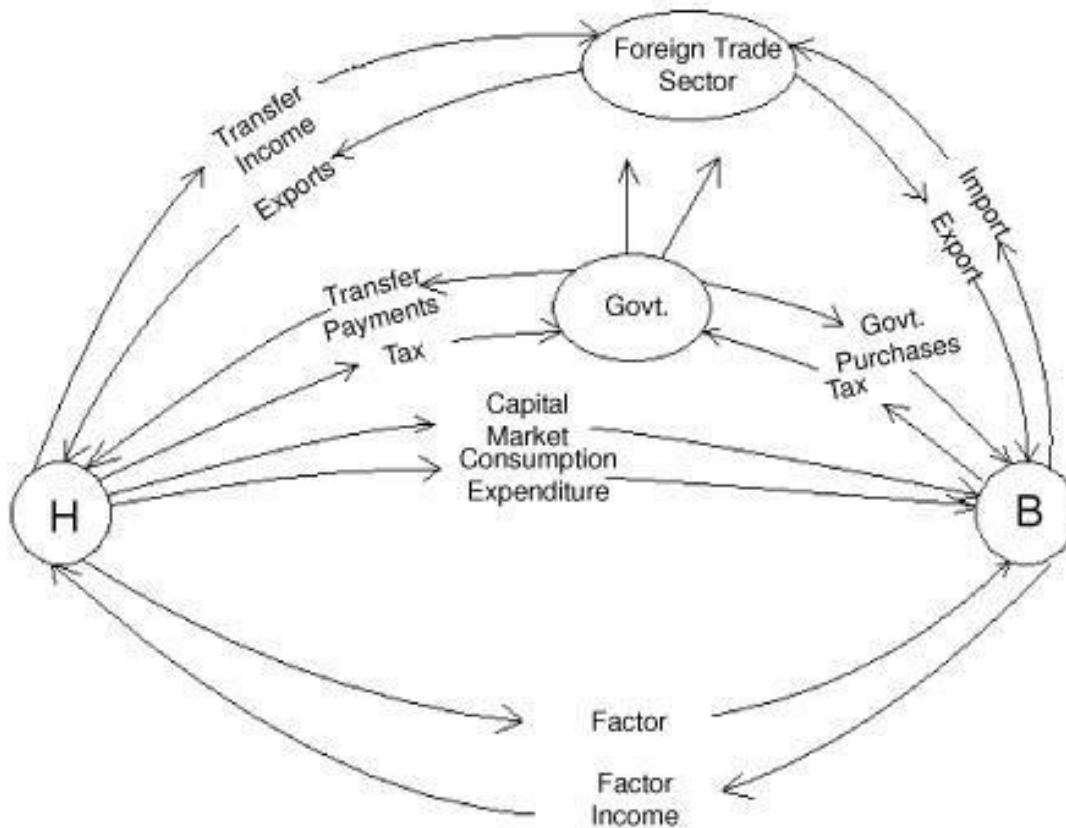
The term Macro Economics applies to the study of relation between broad economic aggregates. It's the theory of income, employment, prices and money. It's the study of economic system as a whole. It's that branch of economic analysis which studies the behaviour of not one particular unit, but of all the units taken together, like total national income, out put and employment, total consumption, saving and investment, aggregate demand and supply and general level of prices. It thus becomes the study of aggregates and is often called –Aggregative Economics as it studies the behaviour of these aggregates over time and space.

Macro economics is of great help in the fluctuation of economic policies. The days of –Laissez-faire are over and govt. intervention in economic matters is an accomplished fact. Government deals not with individuals but with groups and masses of individuals, thereby establishing the importance of macro economic studies. The theory of economic fluctuations can be understood and built up only with the help of macro economics. We are led to analyse the cause of fluctuations in income, output and employment, and make attempts to control them or at least to reduce their severity.

A circular flow of income:

It's the process in which the national income and national expenditure of an economy flow in a circular manner. This process takes place continuously through the activities like production and sale of final product and generation of income.

The actual economy is an open economy which includes four steps consisting of house hold sector, business sector, govt. sector and the rest of the world sector or foreign trade sector.



When the foreigners or the rest of the world buy goods and services produced by domestic firms, they constitute exports. These are inflows into the economy. These create income for the domestic firms. When households buy goods from the rest of the world, the expenditures for it constitutes imports of the economy. So the expenditure on imports of goods form leakages from the economy as there will be outflow of resources.

Thus households buy imported goods from abroad and make payments for them. When household render services in foreign countries they receive transfer payments from the foreign sector. Similarly the business sector exports goods to the rest of the world and also renders services like shipping, banking, insurance etc. to foreign countries. For these they receive payments from abroad and also receive royalties, interests, dividends, profits etc. When business sector buys capital goods, raw materials, consumer goods and services from abroad, it makes payment in exchange. Thus, the payments of business sector to abroad constitute leakages and its receipts constitute the inflows into the circular flow.

Like business firms, government also exports and imports goods and services. Besides, it lends to foreign governments and also borrows from them. When it export goods, it receives payments in exchange from abroad. It also receives payments when foreigners visit the country as tourists or when it supplies services like education, shipping, insurance etc. to foreigners. When it invests abroad, it receives royalties, interests, dividends etc. These receipts form inflows into the circular flow. When govt. makes payments for all such types of services from abroad, these form leakage or outflow from the circular flow.

Thus in an open economy savings, taxes and all types of imports of goods and services form leakage from the circular flow. Similarly, investment, govt. purchases and exports of goods and services form inflows into the circular flow. The imports, exports and transfer payments which arise from other three sectors, excepting the foreign trade sector constitute outflows and inflows which pass through the rest of the world sector.

When exports exceed imports, the economy has a surplus income and when imports exceed exports economy has a deficit income from foreign sector. When exports balance with imports, then there is equilibrium and the circular flow of income and expenditure is maintained. Through this circular flow, all the economic activities in the economy continue and gradually it raises the national income.

National Income: an indicator of Economic Activity

A National Income statistics provide a wide view of the country's entire economy as well as of the various groups in the population who participate as producers and income receivers and that if available over a substantial period, they reveal clearly the basic changes in the country's economy in the past and suggest trends for the future.

There are three ways to look at the level of economic activity, viz. the output, income and expenditure. Depending upon the way we look at them, we call them Gross National Product (GNP), Gross National Income (GNI) and Gross National Expenditure (GNE)

GNP – Sum of the market value of all final goods and service produced in an economy during a given time period.

GNI – Sum of money incomes derived from activities involving current production in an economy during a given time period; and

GNE – Sum of all that is spent of currently produced goods and services by all types of buyers in an economy during a given time period.

National income data is quite helpful for business. In order to undertake long term investments and to formulate business policies, it is quite essential for a dynamic management to do a thorough analysis of changes occurring in the national income. National income data in the hands of an expert managerial economist can prove a life-line for business. It's quite vital for a firm aspiring to capture or retain leadership in business, as it is perhaps one of the most essential ingredients for any business forecasting exercise. The national income data can also be successfully used for determining the product diversification programme and undertaking technological innovations.

Some important terminologies used in National income Accounting:-

GDP (at Market price):-  $C+I+G+(M-X)$

Where C= Consumption expenditure by Household sector

I= Investment expenditure by Business sector

G= Government expenditure

M= Expenditure on imports

X= Exports receipts

GDP (at Factor cost):-  $\text{GDP (at Market price)} - \text{Net indirect taxes}$

Where Net indirect taxes= Total indirect taxes- Subsidies

NNP (at Market price) =  $\text{GDP (at Market price)} - \text{Depreciation}$

NNP (at Factor cost) = National income =  $\text{NNP (at Market price)} - \text{Net indirect taxes}$

$\text{GDP Deflator} = \text{Nominal GDP} / \text{Real GDP}$ , Where Real GDP is calculated at base year prices and Nominal GDP is calculated at current year prices.

$\text{Per capita income} = \text{Total National income} / \text{Total population of the country}$

Methods of measuring National income:

National Income can be measured by any of the three ways

- i) As an aggregate of expenditure of consumption, saving and investment during a year (Expenditure method)
- ii) As an aggregate cost of factor services in the economy during a year (Income method)
- iii) As an aggregate of goods and services produced during a year (Net product method)

Expenditure Method: According to this method, the total national expenditure is the sum of expenditure incurred by the society in a particular year. The expenditure are broadly classified as the personal consumption expenditure (C), net domestic investment (I), govt. expenditure on goods and services (G) and the net foreign investment (i.e. imports & exports)

Therefore  $\text{GNE} = C + I + G + (M - X)$ , where M = Imports, X = Exports

To estimate National Income using expenditure method, we basically use the following steps:

- 1) The first step is to find out the number of units of each of the varieties of goods and services produced during a given year. In this case each different size and quality of a good is taken as a different good.
- 2) The second step is to prepare the price list of all the goods that are listed.
- 3) In the third step, quantities of each good are multiplied with the corresponding prices.
- 4) Lastly, by adding up each of these multiplications, the aggregates are obtained.

Thus the expenditures that will be required to buy all these goods and services will give rise to the National income of the nation.

Income Method: According to this method, the incomes received by all the basic factors of production used in the production process are summed up. The basic factors for the purpose of

national income estimation are categorized as labour and capital, for the simple reason that it is highly difficult to make a distinction between the contribution of land and capital and of labour and entrepreneurship. In those cases where both labour and capital are supplied by same individual, it is not possible to know what part of income of the individual is an account of labour services and what part on account of capital services. The income in such cases is therefore termed a mixed income. Thus, there are three components of national income in this method.

- A) Labour Income: Consists of wages, salaries bonus and social security and welfare contributions.
- B) Capital Income: Includes dividends, pre-tax retained earnings, interest on savings and bonus, rent, royalties and profits of govt. enterprises.
- C) Mixed Income: Comprises the earning from professions, farming enterprises etc. These three components of income are added together to get national income.

Net Product (or Value Added) Method: It is basically known as the product method. According to this method, the sum of net value of goods and services produced at market prices is found. Three steps are involved in calculation of national income through this method.

- i) Gross product is calculated by summing up the money value of output in the different sectors of the economy like industry, agriculture, transport etc.
- ii) The money value of raw material and services used and the amount of depreciation of physical assets involved in the production process are summed up.
- iii) The net output or value added is found by subtracting the aggregate of the cost of raw material, services and depreciation from the gross product found in (i)

In every economy output is classified into various categories depending on the nature of activities from which it originates. These categories of output are known as sectors. From the gross sectoral output, the sectoral cost (of material, depreciation etc.) is subtracted to get the sectoral value added. Aggregate of the value added of all the sectors in the economy during a year is called net national product or national income by product method.

#### Aggregate demand and Aggregate Supply:

These two parameters greatly influence the level of economic activity.

The process of producing goods and services gives rise to an aggregate amount of income equal to the market value of output. The income, thus, received by the firms and households is used in the following manner:

- i) A part is paid to Govt. as taxes (T)
- ii) A part may be saved (S) and is deposited in banks or some other financial institutions.
- iii) A part may be paid for goods imported from abroad (M)
- iv) The major part used for the purchase of consumer goods and services (C)

Thus, the aggregate supply or aggregate income =  $C + S + T + M$

The tax revenues received by the government are used to pay for goods and services bought by the govt. and for its various income distribution programmes. Foreign countries use the money received from the export of commodities to this country to import goods and services from this country. The flow of savings into the capital market, in turn, results in flow out of the capital market in the form of funds for consumer credit, for private investment spending and for government borrowings (to finance spending in excess for tax revenues). So, on the demand side, we have four basic things:

- i) Personal consumption expenditure (C)
- ii) Private Investment spending (I)
- iii) Govt. expenditure on goods and service (G)
- iv) Export of goods and services abroad (X)

Thus the aggregate demand or aggregate expenditure =  $C + I + G + X$

The economy is in equilibrium when aggregate demand equals aggregate supply. That is

$$C + S + T + M = C + I + G + X$$

$$S + T + M = I + G + X$$

Consumption Function:

Consumption refers to the part of income spent by households on the purchase of final consumer goods and services in the economy. An important tool of economic analysis is the



consumption function which establishes the relationship between income and consumption in an economy consumption function (C.F) is expressed by  $C = F(y)$  ——— (1)

It show that consumption increases as income increases, but less than proportionately. It's because of the existence of –psychological law of consumption which states that, –Men are disposed as a rule and on the average to increase their consumption as their income increases, but not by as much as the increase in income.

To explain the relationship between income and consumption we can divide the consumption function (C.F) into two types.

- 1) Average Propensity to Consume (APC): It refers the ratio between the absolute consumption (C) and the absolute income (y).

Therefore it's noted as  $APC = \frac{C}{Y}$  ——— (2)

The value of APC can be equal to, greater than or less than one. In short run, APC declines as income increases.

- 2) Marginal Propensity to Consume (MPC): It refers to the ratio of incremental change in consumption ( $\Delta C$ ) to the incremental changes in income ( $\Delta Y$ )

It's noted as  $MPC = \frac{\Delta C}{\Delta Y}$  ——— (3).

The value of MPC is a positive constant but always less than one (1). In short run, MPC is constant throughout the increase in income.

Both APC and MPC can be explained with the help of a table:

Income (Y)	Consumption (C)	APC (C/Y)	MPC $\left(\frac{\Delta C}{\Delta Y}\right)$
0	40	--	-
100	100	1	0.6
200	160	0.8	0.6
300	220	0.73	0.6
400	280	0.7	0.6

The table shows that MPC remains constant throughout but APC goes on falling.

**Savings:** It refers to that part of income which a consumer does not spend on the current purchase of final goods and services. It may also be seen as postponement of the current consumption. Therefore, savings constitute the Non-consumption part of income.

**Average Propensity to Save (APS):** It refers to the fraction of income which is saved. That is, it refers to the ratio between absolute savings (S) and absolute income (Y).

$$\text{It's noted as } APS = \frac{S}{Y} \text{ ————— (4)}$$

**Marginal Propensity to Save (MPS):** The fraction of any change in income that is saved is called MPS. That is, MPS is a ratio of the change in saving to the corresponding change in income. It's noted as  $MPS = \frac{\Delta S}{\Delta Y}$  ————— (5)

**Determinants of Consumption:**

The various factors that influence consumption function has been classified as subjective and objective factors.

The subjective factors include all the factors related to human psychology, social arrangements and practices etc. The various such factors are as follows:

- 1) **Security Motives:** Families and individuals in modern society are greatly concerned with old age, sickness and other causes of economic insecurity. They are also concerned with family education, home ownership and other unforeseen contingencies. All these encourage them to save. Hence level of consumption falls. It shows that level of consumption depends much upon the feeling of insecurity.
- 2) **Conspicuous Consumption:** It refers to the type of consumption which are mostly determined by clever advertising and emulation of others. This influence an individual's desire for expenditure on goods consumed by others if those are superior to ones which he consumes.

- 3) **Desire for Improvement:** There is a common instinct to look forward to a gradually improving standard of living the stronger the instinct the higher the desire for improvement. It strengthens the desire to save and reduces consumption.
- 4) **Financial Prudence:** The motive for financial prudence mainly influences the propensity to save of corporation and other business units. Uncertainly regarding future, the quantity and quality of existing goods (equipments) and other conditions give rise to motives for withholding a part of current earning. Such prudence offsets the propensity to consume
- 5) **Motive for precaution:** It implies the desire of every individual to withhold some funds so as to face uncertain situations which may come in future.
- 6) **Motive for Independence:** When an individual tries to be self dependant he has to accumulate wealth. Wealth generates income which helps in fulfilling his varieties of wants. But wealth is accumulated through past savings. Thus most of the individuals try to save so as to be independent. It reduces the level of consumption.
- 7) **Motive for pride :** If an individual wants to maintain its pride of having influence in the society, it wants to save more to be a rich man in the society. It induces him to reduce consumption.

The objective factors are mostly external to the behavior or psychology, of individuals and influence their level of consumption.

- A) **Distribution of Income:** A community in which there is more equal distribution of income, the propensity to consume tends to be high. But in communities where there are large inequalities in the distribution of income, the propensity to consume remains low. If there is equality in the distribution of income, then the consumption of low income families will rise more than the fall in consumption of high income families. Thus, MPC will be higher.
- B) **Corporate Financial Policies:** Corporations are in the practice of retaining income, dividend payments and reinvestments. These mostly influence the level of consumption function in a no. of ways. If they save more, it reduces the disposable income of the share holders. Hence their level of consumption reduces.

- C) Windfall gains: Consumption is also influenced by wind fall gains and losses. If any windfall gains occur, it will raise the consumption function upward. But these are less likely to occur in short run.
- D) Changes in Expectations: If people expect a rise in the general price level, they will spend more and more on consumption. If they expect a fall in price level, they will postpone their consumption.
- E) Consumer's Liquid assets: These are constituted by cash balances, saving accounts and govt. bonds in their hands. These are mostly useful in influencing the level of consumption. The real value of these liquid assets increase as a result of either lower general prices with constant liquid assets or larger liquid assets with constant general prices. An increase in the real value of these assets with constant general prices may raise the level of consumption.
- F) Rate of interest: A rise in interest rates might lead to drop in insurance premium rates through its favourable effects on life insurance companies' investment earnings. It tends to encourage institutional saving. A rise in interest rates will lead to a fall in the money value of bonds. It will discourage the propensity to consume of bond holders. But the rate of interest may be a relatively unimportant factor when there is a rigid public policy for maintaining a stable interest rate structure.
- G) Fiscal policy: Heavy taxation and less public expenditure adversely affect the consumption by reducing the disposable income of the people. When public expenditure will be high and taxation will be less, then the level of consumption will increase.

#### Investment:

Investment means creation of new capital assets. In general, investment means real investment which adds to capital equipments and leads to increase in the level of employment and output. It does not include the purchase of existing stocks, shares and securities which constitute merely an exchange of money from one person to another and popularly termed as financial investment.

Real investment is of two types

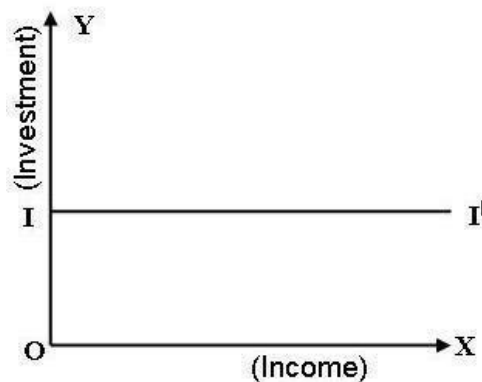
- 1) Autonomous investment
- 2) Induced investment

**Autonomous Investment:** It is the type of investment which is independent of the level of income. It is not influenced by the changes in demand and is mostly associated with public policy. Therefore, it's otherwise known as public investment or govt. investment. The investment in economic and social overheads made by govt. or any other public agencies, are termed as autonomous investment.

Autonomous investment can be expressed with the help of a diagram. In the fig – I I' represents the autonomous investment. It shows that at all levels of income along x axis the level of investment is OI. So, it takes a horizontal shape.

The factors that determine Autonomous investment are many. But all of them are exogenous factors. These include:

- 1) Innovations and inventions
- 2) Growth of population and labour force
- 3) Social and legal institutions
- 4) Weather changes
- 5) WAR etc.



### Business Cycle:

Broadly speaking, business cycles are a kind of fluctuations which occur in business activity with a certain degree of regularity and periodicity. Business cycles are wave like movements found in the aggregate economic activity of a nation. It's characterized by alternating expansionary and contractionary fluctuations in business activity. There is always some measure of regularity in respect of the duration and the time sequence of the upward and downward movements of the business cycle. It represents wave like fluctuations in the level of business activity from the equilibrium or trend line.

A normal business cycle consists of four closely inter-related phases:

i) Revival / Recovery

ii) Expansion / Prosperity

iii) Recession / Down turn

iv) Contraction / Depression

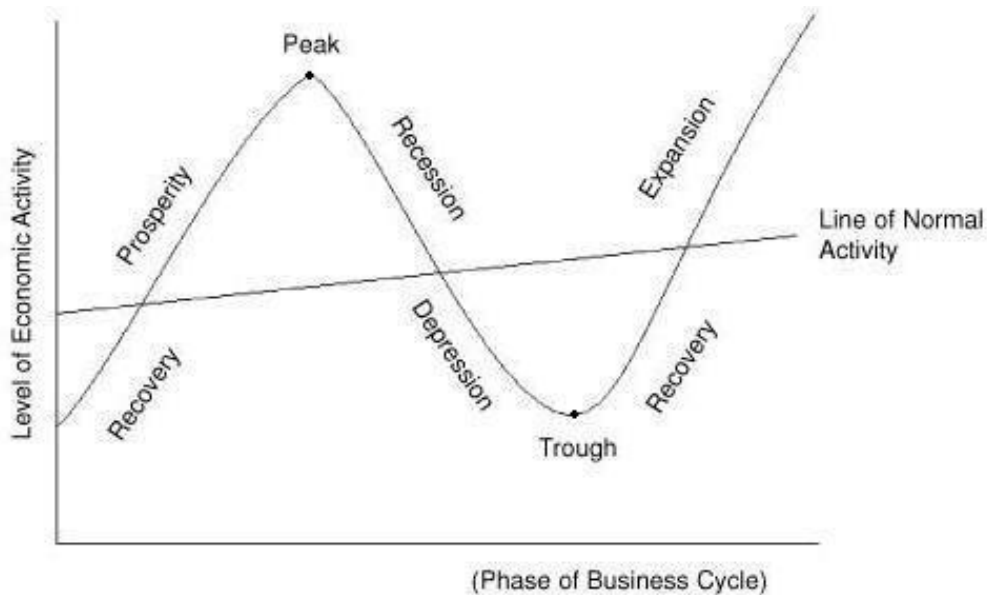
The “Peak” or “Ceiling” on the one hand and the “Trough” or “Floor”, on the otherhand, represents critical turning points in the Trade/Business cycle.

- i) Recovery – This is a period when the industrialists and the businessmen repay the loans taken by them from banks earlier and the frozen stocks held by the banks are released. Stocks of good remain below the normal with the shopkeepers. Once the recovery starts, it results in a snowballing process for investment. The result is that demand orders pour in and the produces get stimulus and encouragement to produce more.
- ii) Prosperity – It’s a state of affairs in which the real income consumed, the real income produced and the level of employment are high or rising and there are no idle resources or unemployed workers or very few either. In other words during prosperity, economic affairs and activities are at the optimum level and there is no wastage of resources of any kind. The level of wages and prices is also high, though wages lag behind prices. But with the passage of time, resources which are fully employed become scarce, output becomes less elastic, bottlenecks appear, costs rise, deliveries become difficult – all these combine to give a boost to the rising volume of money. The rise in price level is also not uniform leading to distortions in the price structure. These lags and distortions bring about an end of cumulative expansion or prosperity phase of the cycle and the recession begins giving way to contraction, depression or regular slump.
- iii) Recession: It’s an imprecise term given to sharp slowdown in the rate of economic growth or a modest decline in economic activity. Recession though spread over a short span of time, marks the turning point during which the forces that make for regular slump or depression finally win over and come to prevail. Once a recession starts, it tends to feed upon itself, like wild fire in a

forest. The recession generates such complex forces as lead the entire system to a head long crash. Its outward signs are the decline in prices, liquidation of stock market, strain in banking system, increase in unemployment, liquidation of bank loans, decline in orders, construction activities. The collapse of confidence and weakening of expectations pave the way for recession

- iv) Depression: It's a natural consequence of the recessionary crisis. If not controlled in the beginning by timely monetary and fiscal measures by govt. which can sustain investment at a high level, recession may give way to even a more grave situation, called depression. A cumulative wave of liquidation that sets in the stock market and money market during recession, passes on to the commodity market and other market turning into a regular depression. It gives rise to panic and collapse of confidence. Imbalances appear in price structures and cost structures. The collapse of confidence and weakening of expectations which pave the way for recession brings about a fall in prices, reduction in output, fall in profits, fall in employment, fall in bank credit. It's the cumulation of these forces that makes the recession so dangerous and a depression so severe. The recession when carried to extremes gives rise to depression – the symptoms are the same.

The different phases followed each other in a regular sequence; cycles continue one after another. The cycle shows fluctuations in total output and not of any single commodity or a group of commodities. Within the movement of total output, production of capital goods and durable consumer goods reveal greater fluctuations than the production of other goods.



### Causes of Business Cycle :

The general factors causing swings in Business activity are as follows:

- i) Banking operations by expanding and reducing credit creation, changing discount rates, and the ratio between deposits and cash reserves, the Banks can change the volume of money supply in the economy, and thus contribution to the cyclical phenomenon.
- ii) Changes in the proportion between capital goods and consumer goods production in the economy can also lead to shortage or surplus in commodity supply in the short run. This results in business cycles.
- iii) Purchasing Power: If the purchasing power does not correspond to the expansion or contraction of production, the market suffers from maladjustments and therefore cyclical fluctuations.
- iv) Profit motive: The profit mania of producer makes him to optimistic. He is under a constant illusion regarding the exact nature and volume of demand. The result is that if the retail trade is little high, the producer magnifies the tendency by expanding production considerably and himself causing a mild boom in the labour and raw material markets. If the retail trade reduces, the over-cautious producer immediately tends to reduce his output and cancels



some of the orders placed by him for raw materials, plant etc. This behaviour tends to intensify the process of rise or fall in prices.

- v) Human Psychology: It has a tendency to undergo frequent changes almost in a cyclical manner – from exuberance to depression. Optimism and pessimism give birth to one another in an endless chain. If the boom develops, psychology takes a turn at the peak and tilts in the opposite direction. The turn in the reverse direction occurs at the bottom of the depression. It is not possible to give any generalized explanation of these psychological changes.
- vi) Cyclical changes in Weather: These changes affect agricultural production and the prices of those basic goods which the working class in a society consumes. This in turn affects the wage rate, cost of raw material etc. thereby contributing to the fluctuation in the economic activity.

Consequences and Measures to solve problems of Business cycle:

During recovery and expansion phases of business cycle, individual firms gain because demand, prices and profits increase. And during recession and depression, firms lose due to the opposite effects.

Even when business is passing through the phase of expansion the firms start experiencing sharp rises in prices of raw materials, rental rates, wage costs, discount rates etc.

At the advanced stage of expansionary phase, the firms find markets highly competitive. The following phase (i.e. recession) lands the firms in even greater difficulty. Demand falls and old orders are cancelled, prices fall and inventory level goes up significantly during this phase. Banks call back their credits. Many a time, firms have to sell their goods even at a loss so as to meet their obligations. The element of overhead cost to the firm is also a major contributor to loss, because the variable factors like labour, raw material, fuel etc. can be relatively easily adjusted to changes in demand. A lot of capacity remains excess during the phase of depression.

Since business can not be eradicated, all that is possible is to reduce the ill-effects to cyclical fluctuations. The suggested remedial measures would naturally be of two types:

- a) The preventive measures, which tend to eliminate the causes that breed economic crises. It includes the following.
  - a) The complete equilibrium between demand and supply in business which is possible if appropriate information is available, at the right time. This will be a good check on over-optimism and over-pessimism which play a vital role in creating cyclical fluctuations.
  - b) Taking due care that inventories do not increase or decrease excessively, financial commitments do not exceed financial resources and plant and equipment increase at a steady rate.
  - c) The overhead cost per unit of output should not be allowed to go up.
  - d) During the phase of depression, soundness in judgment in placing the order must be ascertained before accepting the offer.
- 2) The curative or relief measures that improve upon the ill-effects of business cycle. These include:
  - a) Proper monitoring of costs and their reduction, which can help in overcoming, to some extent, the problem of recession.
  - b) Changes in quality and nature of product, which is likely to give fillip the sagging demand.
  - c) Change in sales methods and strategies by the firms which are helpful to adjust to new situations.
  - d) In order to compensate for the loss of market suffered during the period of depression, the firm can take a positive approach. It can utilize the time period of depression to plan for the introduction of new products as soon as the phase of recovery starts.

In order to tide over the difficult time of depression the firm can utilize a part of its retained profits.

#### INFLATION:

Generally inflation is a situation of persistent rise in prices such a situation arises either because of expansion of money supply in the economy or due to excess demand of commodities by the people which in turn raises the prices of the commodities. Inflation is therefore –a self

perpetuating and irreversible upward movement of the price level caused by an excess of demand over capacity of supply.

Basically, there are two types of Inflation.

- ii) Demand Pull Inflation: It's a situation where the aggregate demand exceeds the economist ability to supply the goods and services at the current prices, so that the prices are pulled upward by the upward shift of the demand function. Such type of inflation can occur because of either rise in quantity of money as determinant of demand or other wide range of influences on determinant of demand.
- iii) Cost Push Inflation: The inflation which arises by the change in supply or cost is known as cost push inflation. In this case the prices rise due to rise in costs of production. It arises mostly due to inadequacy of aggregate demand, resource unemployment and excess capacity, which may occur because of wage rise, profit rise and rise in material cost.

Cause of Inflation: Inflation is the consequence of the disequilibrium between demand and supply of goods and services. Therefore the factors causing excess demand and the factors causing reduction in supply are the basic causes of inflation.

Factors causing excess demand:

- 2) Increase in Money supply.
- 3) Increase in Govt. expenditure
- 4) Increase in private expenditure
- 5) Rise in disposable income
- 6) Increase in population
- 7) Repayment of public debts.
- 8) Generation of Black Money.

Factors causing reduction in supply of goods and services.

- 1) Scarcity of factors of production.
- 2) Hoarding
- 3) Natural Calamities

- 4) Increase in Exports.
- 5) Operation of the law of diminishing return.
- 6) War Period
- 7) Strong Trade Unions

#### Macro Economic Policies:

**Monetary Policy:** It relates to how the government controls the aggregate money supply which in the short run can affect relative prices of goods within the economy and over a longer term alter the relative price of domestic currency to foreign currencies. It also affects interest rates, and has powerful influences on investment and employment, in the short run. The role of determining monetary policy is typically left to the central bank of a country. Monetary policy has two broad objectives – price stability and growth. Ideally, one likes the monetary policy to deliver both, but in reality choice is restricted to only one. If growth is promoted, inflation cost mounts up and if inflation is controlled (for price stability) growth is sacrificed. The choice varies depending upon the external and internal economic environment and the central banks assumption for future.

In India, RBI, being the central bank, adopts monetary policy, in order to control the credit situation, on the fact of business fluctuations. These credit control measures are of two types

- a) Quantitative or general controls
- b) Qualitative or selective controls

Quantitative or general controls include Bank rate variations, open market operations and varying reservations. They aim at regulating the overall level of credit in the economy through the commercial banks.

**Bank Rate:** It's the minimum lending rate at which the central bank discounts bills and securities held by commercial banks. By raising the bank rate, central bank make borrowing costlier, consequently commercial banks borrow less from the central bank. On the other hand commercial banks raise their lending rate. It reduces the money supply in the economy. Reduction in money supply reduces demand for goods and services in the economy, resulting in

the check on price rise. On the other hand, by lowering the bank rate, the RBI can make borrowing by commercial banks cheaper. Commercial banks in turn would lower their lending rate, resulting in greater demand for credit. This would encourage investment, output, employment, income and demand. Consequently, prices would start rising.

**Open Market Operations:** It refers to the sale and purchase of securities by the central bank. When the central bank aims to control inflation, it sells securities in the open market, thereby reducing reserves of commercial banks. This reduces credit in the market. The reduction in money supply helps in checking price rise. Similarly in recessionary conditions, the central bank should buy securities thereby raising money supply in the economy, whose impact would be an increasing in investment, output, income, employment and prices

**Varying Reserve Ratios:** Changes in reserve ratio can help combat inflation and recession. The portion of deposits which a commercial bank has statutorily to keep with the central bank as deposit is called the reserve funds. In order to reduce credit by the commercial banks many a time the central bank increases the percentage of such deposits. Increase in reserve ratio reduces the bank advance, thereby reducing demand for goods and services, and checks price rise during recession, lowering reserve ratio would lower reserves of commercial banks which would encourage greater lending, thus revising economic activity.

Selective credit controls are used to encourage or discourage specific types of credit for particular purposes. In order to check the speculative activity in the economy, the central bank changes the margin requirements to be charged by the commercial banks on those activities. When recession is in some specific sectors of economy the central bank can use some selective credit control measures particularly lowering margin requirements which would help in encouraging greater business activity.

**Fiscal Policy :** Otherwise known as Budgetary policy, it involves the use of taxation, public expenditure and the management of public debt in order to achieve certain specified objectives like a balanced and rapid economic development, full employment, establishment of a welfare state, setting up a socialist pattern of society etc.

During inflationary conditions fiscal policy aims to drain away excess purchasing power by taking rupees out of the income expenditure stream. As a result of this policy the aggregate

demand will reduce, leading to control of price rise. There are two approaches for accomplishing this:

- 1) To reduce government spending and create a surplus budget (where tax revenue exceeds govt. expenditure). The reduction in govt. expenditure would reduce aggregate demand originating in the public sector, and its spillover effect in rest of the economy would also dampen aggregate demand.
- 2) To increase taxes on business and consumers without increasing government expenditure. Obviously, its impact would also be to create surplus budget and reduce the aggregate demand.

Depending on which of the approaches are used, there will be differential impact on public and private sectors.

#### LEARNING OUTCOMES:-

##### Explain the gross domestic product

Gross domestic product, or GDP, measures the market value of all final goods and services produced during the year by resources located in a country, regardless of who owns those resources. The expenditure approach to GDP adds up the market value of all final goods and services produced in the economy during the year. The income approach to GDP adds up all the income generated as a result of that production.

##### Discuss the circular flow of income and expenditure

The circular-flow model summarizes the flow of income and spending through the economy. Saving, net taxes, and imports leak from the circular flow. These leakages equal the injections into the circular flow from investment, government purchases, and exports.

##### Assess the limitations of national income accounting

GDP reflects market production in a given period, usually a year. Most household production and the underground economy are not captured by GDP. Improvements in the quality and variety of products also are often missed in GDP. In other ways GDP may overstate production. GDP fails to subtract for the depreciation of the capital stock or for the depletion of natural resources and fails to account for any negative externalities arising from production.

### Explain how to account for price changes

Nominal GDP in a particular year values output based on market prices when the output was produced. To determine real GDP, nominal GDP must be adjusted for price changes. The consumer price index, or CPI, tracks prices for a basket of goods and services over time. The GDP price index tracks price changes for all output. No adjustment for price changes is perfect, but current approaches offer a reasonably good estimate of real GDP both at a point in time and over time.

### Discuss the effects of inflation on the economy

Inflation is a sustained rise in the average price level. An increase in aggregate demand can cause demand-pull inflation. A decrease in aggregate supply can cause cost-push inflation. Prior to World War II, both inflation and deflation were common, but since then the price level has increased virtually every year.

Anticipated inflation causes fewer distortions in the economy than unanticipated inflation. Unanticipated inflation arbitrarily creates winners and losers, and forces people to spend more time and energy coping with the effects of inflation. Because not all prices change by the same amount during inflationary periods, people have trouble keeping track of the changes in relative prices. Unexpected inflation makes long-term planning more difficult and more risky.

The intersection of the demand and supply curves for loanable funds yields the market interest rate. The real interest rate is the nominal interest rate minus the inflation rate. Borrowers and lenders base decisions on the expected real interest rate.

### Explain the role of consumption

The most predictable and most useful relationship in macroeconomics is between consumption and income. The more people have to spend, the more they spend on consumption, other things constant. The consumption function shows the link between consumption and income in the economy. The slope of the consumption function reflects the marginal propensity to consume, which is the change in consumption divided by the change in income. The slope of the saving function reflects the marginal propensity to save, which is the change in saving divided by the change in income. Increases in net wealth, higher price levels, increases in interest rates, and expectations about future incomes are all factors that can cause consumers to change the amount they want to spend at each income level.

### Discuss gross private domestic investment

Investment depends on the market interest rate and on business expectations. Investment fluctuates from year to year but averaged about one-sixth of GDP during the last decade. We'll assume for now that investment in the economy is unrelated to income.

### Analyze the effects of government purchases of goods and services

Government purchases, which exclude transfer payments, averaged a little less than one-fifth of GDP during the last decade. Government purchases are based on the public choices of elected officials and are assumed to be autonomous, or independent of the economy's income level. Net taxes, or taxes minus transfer payments, are also assumed for now to be unrelated to income.

### Explain how net exports affect aggregate expenditure

Net exports equal the value of exports minus the value of imports. U.S. exports depend on foreign income, not on U.S. income. Imports increase with U.S. income. So net exports decline as income increases. For simplicity, however, we initially assume that net exports are autonomous, or unrelated to domestic income.

### Examine aggregate spending as a whole

Consumption's share of total spending increased from about 62 percent during the 1960s to 69 percent during the most recent decade. The share reflected by government purchases fell from about 22 percent to 18 percent. Investment's share bounced around but averaged about 17 percent of GDP during the period. Net exports' share turned negative, meaning that imports exceeded exports.

### Explain the theory of fiscal policy

The tools of fiscal policy are automatic stabilizers and discretionary fiscal measures. Automatic stabilizers, such as the federal income tax, once implemented, operate year after year without congressional action. Discretionary fiscal policy results from specific legislation about government spending, taxation, and transfers. If that legislation becomes permanent, then discretionary fiscal policies often become automatic stabilizers.

The effect of an increase in government purchases on aggregate demand is the same as that of an increase in any other type of spending. Thus, the simple multiplier for a change in government purchases is  $1/(1 - MPC)$ . A decrease in net taxes (taxes minus transfer payments) affects consumption by increasing disposable income, but does not increase spending as much as would an identical increase in government purchases. The multiplier for a change in autonomous net taxes is  $-MPC/(1 - MPC)$ .

### Describe how aggregate supply affects fiscal policy

An expansionary fiscal policy can close a contractionary gap by increasing government purchases, reducing net taxes, or both. Because the short-run aggregate supply curve slopes upward, an increase in aggregate demand raises both output and the price level in the short run. A contractionary fiscal policy can close an expansionary gap by reducing government purchases,



increasing net taxes, or both. Fiscal policy that reduces aggregate demand to close an expansionary gap reduces both output and the price level.

#### REVIEW PROBLEMS WITH ANSWERS:-

- 1 (Income Approach to GDP) How does the income approach to measuring GDP differ from the expenditure approach? Explain the meaning of value added and its importance in the income approach. Consider the following data for the selling price at each stage in the production of a five-pound bag of flour sold by your local grocer. Calculate the final market value of the flour.

<u>Stage of Production</u>	<u>Sale Price</u>
Farmer	\$0.30
Miller	\$0.50
Wholesaler	\$1.00
Grocer	\$1.50

The expenditure approach adds up the total spending on new production, while the income approach adds up all of the income earned by the resource suppliers in producing flour. The value added is the selling price at each stage of production minus the amount already paid for resources by the firms in earlier stages of production. The sum of the value added at each stage equals the final market price of the good. To avoid double counting, aggregate income can be determined by summing the values added at each stage production. The final market value of the bag of flour, for example, is calculated as  $\$0.30 + 0.20 + 0.50 + 0.50 = \$1.50$ .

- 2 (Expenditure Approach to GDP) Given the following annual information about a hypothetical country, answer questions a through d.

	<u>Billions of Dollars</u>
Personal consumption expenditures	\$200
Personal taxes	50
Exports	30
Depreciation	10
Government purchases	50
Gross private domestic investment	40
Imports	40
Government transfer payments	20

- a. What is the value of GDP?
- b. What is the value of net domestic product?
- c. What is the value of net investment?
- d. What is the value of net exports?

- a.  $C + I_{\text{gross}} + G + (X-M) = 200 + 40 + 50 + (30-40) = \$280 \text{ billion}$
- b.  $\text{GDP} - \text{depreciation} = 280 - 10 = \$270 \text{ billion.}$
- c.  $\text{Gross investment} - \text{depreciation} = 40 - 10 = \$30 \text{ billion}$
- d.  $X-M = 30-40 = -\$10 \text{ billion}$

3 (Investment) Given the following annual data, answer questions a to c.

	<u>Billions of Dollars</u>
New residential construction	\$500
Purchases of existing homes	250
Sales value of newly issued stocks and bonds	600
New physical capital	800
Depreciation	200
Household purchases of new furniture	50
Net change in firms' inventories	100
Production of new intermediate goods	700

- a. What is the value of gross private domestic investment?
- b. What is the value of net investment?
- c. Are any intermediate goods included in the measure of gross investment?

- a.  $\$1.4 \text{ trillion} = 500 \text{ (new residential construction)} + 800 \text{ (new physical capital)} + 100 \text{ (net changes in firms' inventories)}$
- b.  $\$1.2 \text{ trillion} = 1.4 \text{ trillion (gross investment)} - 200 \text{ ( depreciation)}$
- c. Any intermediate goods that were produced during the year but not yet reprocessed or resold are included in the figure for net changes in firms' inventories.

4 (Leakages and Injections) What are the leakages from and injections into the circular flow?  
How are leakages and injections related in the circular flow?

Leakages include net taxes, saving, and imports. Injections consist of investment spending, government purchases, and exports. In equilibrium, leakages from the circular flow equal injections into the circular flow.

5 (Limitations of National Income Accounting) Explain why each of the following should be taken into account when GDP data are used to compare the –level of well-being‡ in different countries:

- a. .Population levels
- b. The distribution of income
- c .The amount of production that takes place outside of markets
- d. The length of the average work week
- e .The level of environmental pollution

This question highlights some of the problems that accompany the indiscriminate use of GDP comparisons across countries or over long periods to compare welfare levels.

- a. GDP per capita is better for measuring well-being than the level of GDP is, and therefore GDP comparisons must be adjusted for population differences
- b. Distribution is ignored in calculating GDP, yet distribution is clearly relevant in using GDP to measure the degree to which the economy is meeting people’s needs.
- c. GDP includes only goods and services sold in markets (with minor exceptions). Yet goods produced informally also affect well-being. In countries where many goods and services are produced outside the official marketplace, the GDP will underestimate the true amount of annual production. Thus, comparing GDP figures can be problematic for countries at varying stages of development.
- d. GDP ignores the value of leisure in contributing to well-being. Increased leisure may lead to an improved quality of life
- e. GDP ignores production costs that are not included in the prices of items sold in markets. To the extent that rising GDP occurs with rising pollution levels, GDP statistics overstate the level of well-being.

6 (Consumer Price Index) Calculate a new consumer price index for the data in Exhibit 4 in this chapter. Assume that current year prices of Twinkies, fuel oil, and cable TV are \$0.95/package, \$1.25/gallon, and \$15.00/month, respectively. Calculate the current year’s

cost of the market basket and the value of the current year's price index. What is this year's percent change in the price level compared to the base year?

Good or Service	Quantity in Market Basket	Prices in Base Year	Cost of Basket in Base Year	Prices in Current Year	Cost of Basket in Current Year
Twinkies	365 packages	\$ .89/ package	\$324.85	\$ .95/ package	\$346.75
Fuel Oil	500 gallons	1.00/gallon	500.00	1.25/gallon	625.00
Cable TV	12 months	30.00/month	<u>360.80</u>	\$15.00/month	<u>180.00</u>
			\$1,184.85		\$1,151.75

Current expenditures now equal \$346.75 for Twinkies, \$625.00 for fuel oil, and \$180.00 for cable TV. Thus, the current year's cost of the market basket is \$1,151.75, and the new price index is 97—the average price level has fallen by 3 percent since the base year. The percentage change is equal to the change in the index (97–100) divided by the base year index (100) then multiplied by 100. The fall in the price of cable TV outweighed the effect of the increases in the prices of fuel oil and Twinkies.

7 (Consumer Price Index) Given the following data, what was the value of the consumer price index in the base year? Calculate the annual rate of consumer price inflation in 2011 in each of the following situations:

- The CPI equals 200 in 2010 and 240 in 2011.
- The CPI equals 150 in 2010 and 175 in 2011.
- The CPI equals 325 in 2010 and 340 in 2011.
- The CPI equals 325 in 2010 and 315 in 2011.

A price index always equals 100 in the base year.

- 20.0 percent
- 16.7 percent
- 4.6 percent
- 3.1 percent (the price level fell)

## **MODULE-2: PRODUCTION AND COST ANALYSIS**

### **Theory of Production:**

Production is an activity that transforms inputs into output. The inputs could be land, labour, capitals, entrepreneurship etc. and the output could be goods or services. Production consists of producing, storing and distributing tangible goods and services. Therefore, production is any activity that increases consumer usability of goods and services. In a production process, managers take four types of decisions :

- i) Whether to produce or not?
- ii) How much output to produce?
- iii) What input combination to use?
- iv) What type of Technology to use?

Our study deals with the analysis of manager's decision rules concerning (iii) and (iv) above.

Three things are necessary in the production process.

- a) Technology
- b) Inputs - Fixed and variable
- c) Time period of production – Short Run / Long run

### **The production Function:**

The production function is purely a technology relationship which expresses the relation between output of a good and the different combinations of inputs used in its production. It indicates the maximum amount of output that can be produced with the help of each possible combination of inputs.

The production function is written mathematically as

$Q = F(L, K, N)$ , where L, K, N are the amounts of land, capital and labour respectively, and Q is the amount of output. The production function rests on two main assumptions.

- 1) Technology invariant. If technology changes, it would result in alternation of the input – output relationship, resulting in another production function.
- 2) It is assumed that firms utilize their inputs at maximum levels of efficiency. In other words, the production function includes all the technically efficient methods of production. If a production function includes only a single technically efficient method, we call it a one-process production function; if it includes two efficient process, It's a two process production function and son on.

Although a firm often uses several inputs, for simplicity we use a two-input case (Whose result can be generalized to the situation of more than two inputs). Thus we shall use a production function of the form

$Q = F(L, K)$ , where L, K are labour and capitals respectively and Q is quantity of output.

It must noted that the form of production function is taken a given, by a managerial economist, because formulation of a production function falls, in fact, under the purview of production engineering. A managerial economist works only with the given production function.

A hypothetical production function is displayed in the following table where different amounts of output (Q) resulting from various combinations of labour (L) and capital (K) are given.

A hypothetical production function

Units of Labour (L)	Quantity of output (Q)		
3	40	60	80
2	30	50	65
1	20	35	55
	1	2	3 units of capital (K)

N.B – Technical efficiency and economic efficiency –

We say that a firm is technically efficient when it obtained maximum level of output from only given combination of inputs. The production function incorporates the technically efficient method of production. A producer can not decrease the amount of one input and at the

same time maintain the output at the same level without increasing one or more inputs. When economists use production function, they assume that production is technically efficient.

On the other hand, we say a firm is economically efficient, when it produces a given amount of output at the lowest possible cost for a combination of inputs provided the prices of the inputs are given. Therefore, when only input combinations are given, we deal with the problem of technical efficiency, i.e. how to produce maximum output. On the other hand, when input prices are also given in addition to the combination of inputs, we deal with the problem of economic efficiency, i.e. how to produce a given amount of output at the lowest possible cost.

#### Short Run Analysis of Production Function:

Before a more detailed analysis of short run production function is undertaken, certain key terms used in the analysis must be clarified. These are total product (TP), Marginal product (MP) and Average product (AP). Total Product (TP) i.e. Q is the total amount of output resulting from the use of different quantities of inputs. If we assume labour (L) to be the variable input (Capital (K), held constant), then Marginal product of labour ( $MP_L$ ) is defined as the change in the total product per unit change in labour, i.e.

$$MP_L = \frac{dQ}{dL} \text{ where } d = \text{A change in.}$$

It means  $MP_L$  refers to the net addition to the total product as a result of use of an additional unit of labour. Marginal product can be found only when the factor input is a variable factor. Similarly, average product of labour ( $AP_L$ ) may be defined as total product per unit of labour.

$$\text{So, } AP_L = \frac{Q}{L}$$

#### Law of variable proportions (Reproduction function with one variable input):

Under this law, we study the effect on output of variation in factor proportions. The law refers to, –The diminishing amount of extra output that we get when we successively add equal extra units of a varying input to a fixed amount of some other input, Therefore, the law stated that, –If we increase the quantity of one input which is combined with a fixed quantity of another

input, the marginal physical productivity of the variable input must decline. The law of variable proportion is otherwise known as —The law of diminishing Returns.

Assumption to the Law of variable proportion

- 1) The Techniques of production or the state of technology is assumed to be given and unchanged. If there is improvement in technology, then marginal and average product may rise instead of diminishing.
- 2) The process of production continues with one of the factors which varies while the quantity of other factor must be fixed.
- 3) The fixed factor can be adapted to the change in quantity of the variable factor.
- 4) The variable factor is homogeneous or identical in all respects i.e. in size, quality, efficiency etc.

The law of variable proportion can be explained a better way with the help of the following table. The manner in which TP, MP and AP changes, are expressed in the table. It is observed that each of them rises up to a certain limit beyond which each of them falls down.

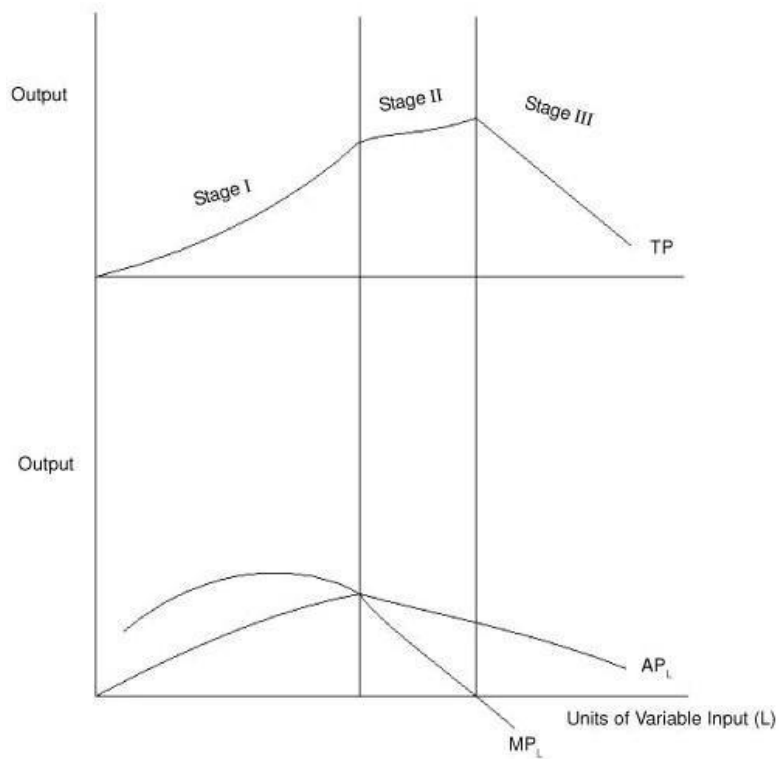
Short Run production Function : TP, AP and MP

	Fixed Input(K)	Variable Input (L)	Total Product (TP)	Marginal Product (M)	Average Product (AP)
1 <sup>st</sup> Stage	1	1	5	-	5
	1	2	13	8	6.5
	1	3	23	10	7.6
	1	4	35	12	8.75
	1	5	50	15	10
2 <sup>nd</sup> Stage	1	6	58	08	9.6
	1	7	62	04	8.85
	1	8	65	03	8.125
	1	9	65	00	7.22
3 <sup>rd</sup> Stage	1	10	60	-5	6
	1	11	54	-6	4.9



The three stages of production:

The Short Run production function can be divided into three distinct stages of production. We may use the following figure to explain these stages.



In the figure, Stage I runs from zero units of variable input to the level where  $AP_L$  is maximum, Stage II follows Stage 1 and then proceeds to the point where  $MP_L$  is zero (i.e.  $TP$  is maximum) Stage III continue on from that point.

It's obvious that no -Rational Firm will change to operate either in Stage I or in Stage III. In Stage I the firm is grossly underutilizing its fixed capacity, so in this case, marginal product of variable input rises (i.e. each additional unit of the variable vector contributes more to output than the earlier units)

It is therefore profitable for the firm to keep on employing addition as up its of the variable input. In Stage III, the firm grossly over utilizes its fixed capacity. In other words, it would have so little fixed capacity relative to the variable input it uses, that the marginal contribution of each additional unit of the variable input is negative. It's therefore unadvisable to use any additional unit. Even if cost of variable input is zero, it's still unprofitable to move into

Stage III. It can, thus, be concluded that Stage II is the only relevant range for a –Rational Firm in a competitive situation. However, it must be noted that, the exact number of labour units hired by the firm within stage II can be found out only when we have the corresponding data on wage rate.

Long Run production Function: A case of returns to scale:

A situation where all inputs are subject to variations is a case of Long-Run production function. We know that in the short Run, fixed inputs set an upper limit to the output because additional units of a variable factor, say, labour are not accompanied by a corresponding change in the fixed factors of production. Consequently, the contribution of the variable input declines. By definition, in the long run, such limitations do not exist. In the long run all inputs can change, let's consider two inputs, labour (L) and capital (K), these can change in two ways:

- 1) Both L and K can change in the same proportion, implying that (K/L) ratio or technique of production remains the same.
- 2) L and K change in different proportion, implying that K/L ratio or technique of production varies with change in output.

The percentage increase in output when all inputs vary in the same proportion is known as –Returns to Scale. Obviously, Returns to Scale relate to greater use of inputs maintaining the same technique of production. When Returns to Scale occurs, three alternative situations are possible

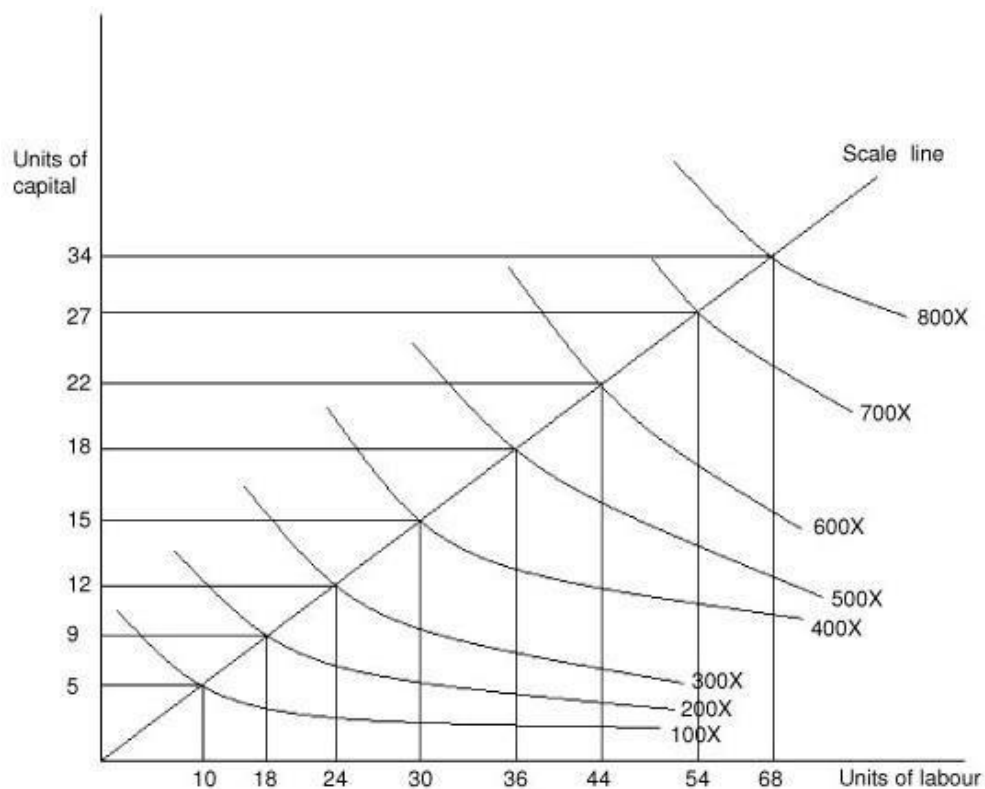
- 1) Constant Returns to Scale – Output increases in the same proportion as the increase in inputs.
- 2) Increasing Returns to Scale – Output increases by a greater proportion than the increase in inputs.
- 3) Decreasing Returns to Scale – Output increases by a lesser proportion than the increase in inputs.

The three kinds of Returns to Scale can be illustrated with the help of the following table.

A Hypothetical Example to show returns to scale

Units of Labour (L)	Units of Capital (K) (Rs. 000)	Percentage increase in L and K	Total product (—00l units)	Percentage increase in Total product	Returns to scale
1	100	-	100	-	Increasing
2	200	100	220	120	
3	300	50	350	59	
4	400	33.33	500	42.9	
5	500	25	625	25	Constant
6	600	20	750	20	
7	700	16.66	860	14.66	Decreasing
8	800	14.29	940	9.3	
9	900	12.5	1,000	6.4	

The three kinds of Returns to Scale can also be expressed graphically as follows :



The above figures shows iso-quants reflecting returns to scale, Here, it should be noted that, an iso-quant is a curve representing the various combinations of two inputs that produce the same amount of output. It's a curve which shows the different combinations of the two inputs producing a given level of output. In the fig. along the ray, the proportion in which labor and capital are employed, remains constant, the ratio being 10 labour to 5 capital, here. When we move from point A to C, we double the output, but input less than doubles – A, case of increasing returns to scale. Between points C and E, there are constant returns to scale – input increases by the same percentage as does the output. Beyond point E, there are decreasing returns to scale – output increases by a lesser proportion than the increase in inputs. So, the figure shows that spacing of iso-quants along a ray indicates whether returns are increasing, constant or decreasing.

#### Causes of Increasing Returns to Scale:

The reasons for experiencing increasing Returns to Scale are:

- 1) In case of large scale production, work can be divided into small parts and each individual can attain specialization by handling only one part of the work.
- 2) There are some industries in which it is not possible to undertake production at a small scale, e.g. blast furnaces, earth moving equipments etc.
- 3) In some cases, increased size of operation gives us some dimensional advantages. This is important especially for those industries where storage is an important activity, like chemical industries, cold storage etc.

#### Cause of Decreasing Returns to Scale –

The advantages of mass production have their limitations.

This is so because,

- 1) Coordination and control become increasingly difficult.
- 2) Information may be lost or distorted when it is transmitted down the hierarchy from top management level to lower level management to supervisors and then to the workers.

### Producer's Equilibrium:

The production manager always confronts with the following two choice decisions, in the process production.

- 1) Choose the input combination that yields the maximum level of output with a given level of expenditure.
- 2) Choose the input combination that leads to the lowest cost of producing a given level of output.

i.e. in the first case, to maximize output subject to a given cost and in the second case, to minimize cost subject to a given level of output (given input prices)

Both the decisions lead to the attainment of Equilibrium by the producer. Therefore, produces Equilibrium is the position of optimal input combination – optimal output. This position

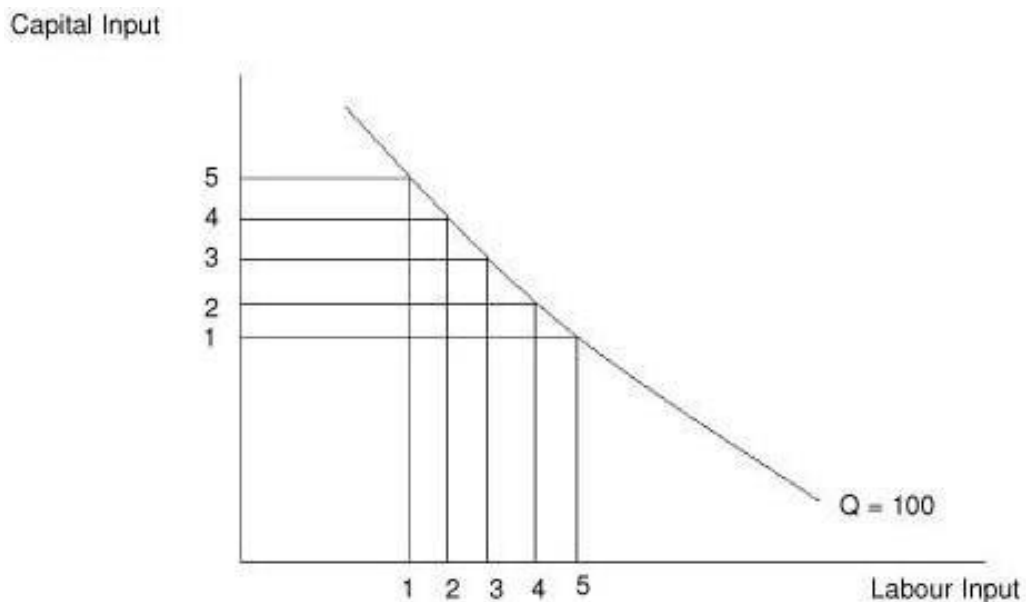
of maximum output can be attained when ,  $MRTS_{L,K} = \frac{P_L}{P_K}$  i.e. Managerial Rate of Technical

substitution of labour for capital has to be equated with the ratio between the prices of labour and capital respectively.

To analyse producer's equilibrium, it's necessary to be familiar with the concept of production isoquants and isocost line.

### Production Isoquant :

A production isoquant (equal output course) is the locus of all those combinations of two inputs which yields a given level of output. With two variable inputs, capital and labour, the isoquant gives, the different combinations of capital and labour, that produces the same level of output.



The above figure shows production isoquant. The isoquant depicts various combinations of capital and labour inputs that can produce 100 units of output.

Generally there are a number of ways (combination of inputs) that a particular output can be produced. The rate at which one input can be substituted for another input, if output remains constant is called the marginal rate of technical substitution (MRTS). It is defined in case of two inputs, capital and labour, as the amount of capital that can be replaced by an extra unit of labour, without affecting total output.

$$MRTS_{L \text{ for } K} = \left| \frac{\Delta K}{\Delta L} \right|$$

It is customary to define MRTS as a positive number, since  $(\Delta K / \Delta L)$  the slope of the isoquant, is negative. Over the relevant of production the MRTS diminishes. That is more and more labour is distributed for capital, while holding output constant, the absolute value of  $(\Delta K / \Delta L)$  decreases. Since along in a isoquant, the level of output remains the same, if  $\Delta L$  units of labour are substituted for  $\Delta K$  units of capital, the increase in output due to units labour (namely,

$\Delta L \times MP_L$ ) should match the decrease in output a decrease of units of capital (namely,  $\Delta K \times MP_K$ ). In other words along an isoquant,

$$\Delta L \times MP_L = \Delta K \times MP_K$$

$$\Rightarrow \frac{\Delta K}{\Delta L} = \frac{MP_L}{MP_K}$$

However, as we have seen earlier  $(\Delta K / \Delta L)$  is equal to  $MRTS_{L,K}$  and hence we get the following expression for  $MRTS_{L,K}$  as the ratio of the corresponding marginal products

$$MRTS_{L,K} = \frac{MP_L}{MP_K}$$

$$\text{i.e. slope of isoquant } (MRTS_{L,K}) = \frac{MP_L}{MP_K}$$

Iso Cost line –

An iso cost line shows various combination of the factor inputs that the firm can buy with a given outlay (expenditure) and factor prices. Every point on an iso cost line costs the same to the firm.

Algebraically, the isocost or the budget line can be expressed

$$C = (P_L \times L) + (P_K \times K)$$

Where C = Total budget allocation for inputs labour and capital

$P_L$  and  $P_K$  = Prices of labour and capital respectively.

L and K = Quantity of labour and capital respectively.

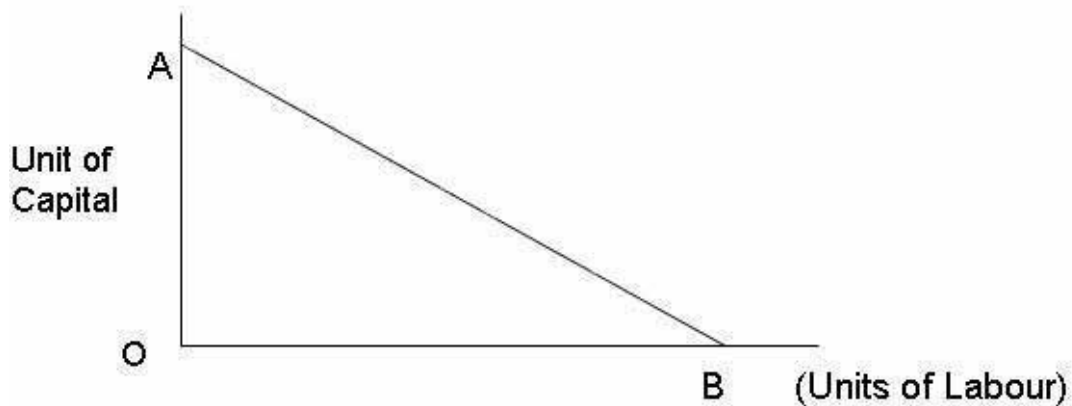
Since prices of inputs are taken as constant, the budget line acquires a straight line shape. Slope of the Budget line equals relative prices.

Now, the budget equation

$$C = (P_L \times L) + (P_K \times K)$$

$$\Rightarrow K = \frac{C}{P_K} - \frac{P_L}{P_K} \cdot L$$

Thus the slope of the Budget Line is  $\left( \frac{P_L}{P_K} \right)$



The maximum amount of capital that can be bought, if only capital is purchased, is  $OA = \frac{C}{P_K}$ .

If only labour is purchased then the maximum amount of labour that can be brought is  $OB = \frac{C}{P_L}$ .

The two points and B can be joined by a straight line. This straightline is called the Iso Cost line or Equal Cost line, which shows the alternative combination of (K, L) that can be purchased for the given expenditure level.

Now, slope the iso cost is,

$$\frac{OA}{OB} = \frac{C/P_K}{C/P_L} = \frac{C}{P_K} \times \frac{P_L}{C} = \frac{P_L}{P_K}$$



For, equilibrium, it's necessary to ensure that slope of Iso quant is equal to the slope of Iso cost line. That is, for optimization the cost must be tangent to the iso quant. i.e.

$$MRTS_{L,K} = \frac{P_L}{P_K} \Rightarrow \frac{MP_L}{MP_K} = \frac{P_L}{P_K}$$

### Emperical Production Function :

The short run output decisions and long run planning often require more than just the conceptual frame work of production theory. That is quantitative estimates of the parameters of the production function are required for some decisions.

In the process of decision making a manager should understand clearly the relationship between the inputs and output on one hand, and output and costs on the other. The short run production estimates are helpful to production managers in arriving at the optimal mix of inputs to achieve a particular output target of a firm. This is referred to as the –last cost combination of inputs in production analysis. Estimation of the long run production function may help a manager in understanding and taking decisions of long term nature such as capital expenditure.

Although, a variety of functional forms have been used to describe production relationship, the most popular among them is the Cobb-Douglas production function.

### Cobb-Douglas Production Function:

The general form of C-D function is expressed as  $Q = AL^\alpha K^\beta$  where A,  $\alpha$  and  $\beta$  are constants that, when estimated, describe the quantitative relationship between the inputs (K and L) and output (Q). The sum of the constant ( $\alpha + \beta$ ) can be used to determine Returns to Scale. That is

$$\alpha + \beta = 1 \Rightarrow \text{Constant returns to scale}$$

$$\alpha + \beta > 1 \Rightarrow \text{Increasing returns to scale}$$

$$\alpha + \beta < 1 \Rightarrow \text{Decreasing returns to scale}$$

In a C–D function the exponent of a factor gives the ratio between the marginal product and average product. Given the production function

$$Q = AL^\alpha K^\beta$$

$$MP_L = \frac{\partial Q}{\partial L}$$

$$= \alpha AL^{\alpha-1} K^\beta = \alpha (AL^\alpha K^\beta)^{-1}$$

$$= \alpha \left( \frac{Q}{L} \right) = \alpha AP_L$$

$$\Rightarrow \alpha = \frac{MP_L}{AP_L}$$

Where,  $AP_L$  and  $MP_L$  are the average and marginal products of labour respectively.

Similarly we find that  $MP_K = \beta \left( \frac{Q}{K} \right)$

$$\Rightarrow \beta = \frac{MP_K}{AP_K}$$

$\alpha$  and  $\beta$  represent the labour and capital shares of output respectively. The C–D function is a power function which can be converted into a linear form by taking it in a logarithmic form:

$$Q = AL^\alpha K^\beta$$

$$\log Q = \log A + \alpha \log L + \beta \log K$$

In a C-D production function if one of the inputs is zero, output is also zero. If we look at the form of the C-D production function, we find that it's a multiplicative in nature. In such a

function, if one input takes the value zero, the output becomes zero. It implies that all the inputs considered in the function are necessary for the production process to take place.

Importance of Cobb-Douglas production function –

C-D production function is most popular in imperial research. The reasons for this are

- 1) The C-D function is convenient for international and inter-industry comparisons. Since  $\alpha$  and  $\beta$  are pure numbers, (i.e. independent of units of measurements) they can be easily used for comparing results of different samples having varied units of measurement.
- 2) Another advantage is that this function captures the essential non-linearities of production process and also has the benefit of the simplification of calculation by transforming the function into a linear form with the help of logarithms. The log-linear function becomes linear its parameters, which is quite useful to a managerial economist for his analysis.
- 3) In addition to being elasticities, the parameters of C-D function also possess other attributes. For example, the sum of  $(\alpha+\beta)$  shows the returns to scale in the production process.  $\alpha$  and  $\beta$  represent the labour share and capital share of output respectively and so on.
- 4) This function can be used to investigate the nature of long-run production function, viz – increasing, constant and decreasing returns to scale.
- 5) Although in its original form, C–D production function limits itself to handling just two inputs (e.g. L and K), it can be easily generalized for more than two inputs, like

$$Q = AX_1^a X_2^b X_3^c \text{-----} X_n^p$$

Where  $X_1 X_2 X_3 \text{-----} X_n$  are different inputs.

## THEORY OF COSTS

Every Business has two side: Income and Expenditure. The Expenditure side of business constitutes Cost and Income side constitutes the Revenue. The analysis of cost is important in the study of Managerial Economics because it provides a basis for two important decisions made by Managers :

- a) Whether to produce or not; and
- b) How much to produce when a decision is taken to produce

### COST CONCEPTS :-

Some of the cost concepts that are frequently used in the Managerial decision making process, may be classified as follows :

#### 1) Actual Cost and Opportunity Cost:-

Actual costs are those cost which a firm incurs while producing or acquiring a good or service like payment for labor, rent etc. Suppose we pay Rs. 100 per day to a worker when we employ for 10 days, then the cost of labour is Rs 1000. This is the cost actually incurred by the firm in the process of production. It is otherwise known as Accounting Cost or Acquisition Cost or Outlays Cost.

Opportunity cost is the value of a resource in its next best use. It's the cost for the next best alternative use. The opportunity cost is really meaningful in the decision making process. For example, consider a firm that owns a building and the firm do not pay rent for its use. If the building was rented to others, the firm could have earned rent. The foregone rent is an opportunity cost of utilizing the office space and should be included as part of the cost of business. Sometimes this opportunity cost, are called as alternative cost.

#### 2) Explicit Cost and Implicit Cost:-

Explicit costs are those cost that involve an actual payment to other Parties. Therefore, an explicit cost is the monetary payment made by a firm for use of an input owned and controlled by others. Explicit costs are also referred to by accounting costs. For example a firm pays Rs 150 per day to a worker, and engages 10 workers for 10 days, and then the explicit cost will be Rs 15,000 incurred by the firm. Other types of explicit costs include renting a building, amount & rent on advertising etc.

Implicit cost represents the values of foregone opportunities but do not involve an actual cost payment. Implicit cost are just as important as explicit costs but are sometimes neglected because they are not as obvious. For example, a manager who runs his own business foregone the salary that could have been earned by working for someone else. Therefore, an implicit cost generally is not included in accounting statements, since it is the opportunity cost of using resources that are owned or controlled by the owners of the firm, who could have received it had they used their own resource in their best alternative use rather than using the resources for their own firm's production.

### 3) Accounting Cost and Economic Cost :-

Accounting costs are the actual or outlay costs. These costs point out how much expenditure has already been incurred on a particular process or on production as such. These costs generally relate to the past. The accounting costs are useful for managing taxation nuds—as well as to calculate profit or loss of the firm on the other hand, economists take forward looking view of the firm. They are concerned with what cost is expected to be in the future and how the firm might be able to rearrange its resources to lower its cost and improve its profitability. They must therefore be concerned with opportunity cost along with explicit cost. Since the only cost that matter for business decision are future costs. It is the economic costs that are used for decision making.

### Controllable and Non- Controllable Costs:-

Controllable costs are those costs which are capable of being controlled or regulated by executive vigilance and therefore can be used for assessing executive efficiency.

Non-controllable costs are those which cannot be subjected to administrative control and supervision. Most of the costs are controllable, except, of course, those due to obsolescence and depreciation. The level at which such control can be exercised, however, differs; some costs (like capital costs) are not controlled at the shop level.

### Out-of-Pocket Costs and Book Costs:-

Out-of-Pocket Costs are those costs that improve current cash payments to outsiders. For example, wages and salaries paid to the employees are Out-of-Pocket Costs. Other examples of Out-of-Pocket Costs are payment of rent, interest, transport charges etc. On the other hand, Book Costs are those business costs which do not involve any cash payments but for them a provision is made in the book of account to include them in profit and loss accounts and take tax advantages. For example, salary of owner manager, if not paid is a book cost.

### Private Costs & Social Cost:-

Private Costs are those that accrue directly to the individuals or firm engaged in relevant activity.

Social Costs, on the other hand are passed on to persons not involved in the activity in any direct way (i.e. they are passed on to society at large)

### Sunk Cost and Incremental cost :-

Sunk costs are expenditures that have been made in the past or ..... be paid in the future a part of contractual agreement of previous decision. For example, the money already paid for machinery, equipment, inventory and future rental payment on a warehouse that must be paid a part of a long term lease agreement are Sunk costs. In general, Sunk costs are not relevant to economic decisions. Sometimes the Sunk costs are also called a non-avoidable or non-escapable costs.

Incremental costs refer to total additional cost of implementing a managerial decision. Change in product line, change in output level, adding or replacing a machine, changing distribution channels etc. are examples of incremental costs. Sometimes these costs are also called a avoidable or escapable costs. Moreover, since incremental costs may also be regarded as the difference in total costs resulting from a contemplated change, they are also called differential costs. These costs are important for decision making purpose.

## Relevant costs and Irrelevant costs :-

The relevant costs for decision making purposes are those costs which are incurred as a result of decision under consideration. The relevant costs are also referred to as the incremental costs. They are there main categories of relevant or incremental costs.

They are

- 1) The present period explicit costs
- 2) The opportunity costs implicitly involved in the decision
- 3) The future cost implications that flow from the decision.

On the other hand, costs that have been incurred already and the costs that will be incurred in future, regardless of the present decision are irrelevant costs as far as the current decision problem is concerned.

## Direct costs and Indirect costs:-

Direct costs are the ones that have direct relationship with a unit of operation like a product, a process or a department of the firm. In other words the costs which are directly and definitely identifiable are the direct costs. For example, the use of raw material, labour input and machine time involved in the production of each unit can usually be determined. So, the costs incurred by the firm on all these things, referred to as direct costs.

Indirect costs are those whose course cannot be easily and definitely traced to a plant, a product, a process or a department. For example, stationery and other office administrative expenses, electricity charges, depreciation of plant and buildings, and other such expenses that cannot easily and accurately be separated and attributed to

individual units of production, except on orbitarily basis. Such costs are termed as indirect costs.

Fixed cost and Variable cost :-

Fixed costs are that part of the total cost of the firm which does not change with output. Expenditures on depreciation, Rent of land and buildings, property taxes and interest payment on Bonds are examples of fixed costs.

For given a capacity fixed costs remain the same irrespective of actual output.

Variable costs on the other hand change with changes in output. Examples of variable costs are wages and expenses on raw materials.

Total cost, Average cost and Marginal cost :-

Total cost (TC) of a firm is the some total of all the explicit and implicit expenditures incurred for producing a given level of output. It represents the money value of the total resources required for production of goods and services. For examples, a shoe makers total cost will include the amount he/she spends on leather, thread, rent for his/her workshop, interest on borrowed capital, wages and salaries of employees etc. and the amount he/she charges for his/her services and funds invested in the business.

Marginal cost (MC) is the extra cost of producing one additional incurred in producing one extra unit and this yields the marginal cost i.e.  $MC = d(TC)/d(N)$ , where d: A change in MC refers to the charge in total cost associated with a one-unit change in output. This cost concept is significant to short term decisions about profit maximizing rates of output.

The total costs concept is useful in break even analysis and finding out weather a firm is making profit or not. The Ac concept is significant for calculating the per unit profit. The marginal and incremental cost concepts are needed in deciding weather a firm needs to expand its production or not. In fact, the Relevant costs to considered will depend upon the situation or production problem faced by the manager. Cost control efforts can be aided considerably by using Ratio Analysis technique. Ratio is a yard



stick which provides a measure of relation between the two figures compared. The ratio may be expressed in percentage term (e.g cost of material as a percent of total production cost), as a proportion (e.g net profit as a production of total assets) or as a rate (e.g sales per Rupees of total assets). In ratio analysis, a desirable ration is predetermined, the actual performance is compared with ratio and the relation are behind the ratio analysis in that management must take a greater interest in relative as opposed to absolute figures in order to control costs. Ratio analysis is mainly used as an external standard i.e. for comparing performance with organization in the industry. However, the ratio analysis can also be effectively used for comparing the performance of the firm overtime.

#### Revenue Analysis :-

Revenue represents the income side of business. It can be of 3 types:

**Total Revenue :-** It refers to the total money receipts received by a business organization from the sale of its products in the market. It's denoted as  $P_x \times Q_x$ , where x: The Product;  $P_x$ : Price of x;  $Q_x$ : Quantity of x sold in the market.

**Average Revenue :-** It represents the income per unit of the product sold in the market. It's arrived at by dividing Total Revenue with total output sold in the market. In generations AR is ..... equal to the price of the product.

**Marginal Revenue :-** It refers to the net additional income to the total revenue when an extra unit of the product is sold. It is equal to the ratio between change in Total revenue and change in total output sold in the market  $MR = \Delta TC / \Delta TO$

#### LEARNING OUTCOMES

##### 1 Explain the relationship between cost and profit

Firms try to earn a profit by transforming resources into salable products. These resources, whether explicit or implicit, have an opportunity cost that must be accounted for. Accounting profit equals total revenue minus explicit costs. Economic profit equals total revenue minus all costs, both implicit and explicit.

## 2 Identify the elements that affect production in the short term

Output can be changed in the short run by adjusting variable resources, such as labor, but the size, or scale, of the firm is fixed in the short run. Firms experience increasing marginal returns when increasing a variable resource, but only to a certain point. Eventually, the law of diminishing marginal returns takes hold, thus restricting a firm's ability to affect production in the short term.

## 3 Explain how the costs of production vary with output in the short run

A fixed cost does not vary with output in the short run. Variable cost is the cost of variable resources, such as labor, that do vary with output in the short run. When the firm experiences increasing marginal returns, the marginal cost of output falls; when the firm experiences diminishing marginal returns, the marginal cost of output increases.

## 4 Describe how firms use the long-run average cost curve to make choices about production

For any given firm, the long-run average cost curve is formed by connecting the points on the various short-run average cost curves that represent the lowest per-unit cost for each rate of output. Each of the short-run average cost curves is tangent to the long-run average cost curve, or planning curve. These points of tangency represent the least-cost way of producing each particular rate of output.

If a firm experiences economies of scale, long-run average cost falls as output expands. A larger scale of operation allows a firm to use larger, more efficient techniques and machines and to assign workers to more specialized tasks. Diseconomies of scale may eventually take over as a firm expands its plant size, increasing long-run average cost as output expands.

### SOME IMPORTANT TERMINOLOGIES IN PRODUCTION AND COST ANALYSIS:-

#### Fixed and Variable Resources

- Variable resources: Can be varied quickly to change the output rate.
- Fixed resources: Resources that cannot easily be altered.
- Short run: At least one resource is fixed; the size or scale of the firm is fixed.

- Long run: No resource is fixed; all resources can vary.
- Production function: The relationship between the amount of resources employed and total product or output.
- Marginal product: The change in total product resulting from an additional unit of labor.

**Increasing Marginal Returns: As marginal product increases, the firm experiences increasing marginal returns from labor because additional workers can specialize and make more efficient use of the fixed resources.**

Diminishing Marginal Returns: As more of a variable resource is added to a given amount of a fixed resource, the marginal product eventually declines and could become negative.

The Total and Marginal Product Curves: When marginal product

- Rises, total product increases at an increasing rate.
- Decreases, total product increases at a decreasing rate.
- Is negative, total product is decreasing.

Explicit and Implicit Costs

- Explicit costs: Actual cash payments for resources purchased in resource markets.
- Implicit costs: Opportunity costs of using resources owned by the firm or provided by the firm's owners.

Costs in the Short Run:

- Fixed cost: Costs that are independent of output and must be paid even if no output is produced.
- Variable cost: Cost of variable resources

Total Cost and Marginal Cost in the Short Run

**Total Cost: The sum of fixed cost and variable cost.  $TC = FC + VC$ .**

**Marginal Cost: The change in total cost divided by the change in output.  $MC = \Delta TC / \Delta q$ .**

- Changes in marginal cost (MC) reflect changes in the marginal productivity (MP) of the variable resource.
- When marginal returns are increasing, the marginal cost of output decreases.
- When marginal returns are diminishing, the marginal cost of output increases.

Total and Marginal Cost Curves: The slope of the total cost curve at each rate of output equals the marginal cost at that rate of output.

### Average Cost in the Short Run

- Average Variable Cost: Variable cost divided by output or  $VC/q$
- Average Total Cost: Total cost divided by output or  $TC/q$

The Relationship Between Marginal Cost and Average Cost: Marginal cost pulls down average cost where marginal cost is below average cost and pulls up average cost where marginal cost is above average cost.

Summary of Short-Run Cost Curves: The law of diminishing marginal returns determines the shape of short-run cost curves:

- When the marginal product of labor increases, the marginal cost of output falls.
- When marginal cost is less than average cost, average cost falls.
- When marginal cost is above average cost, average cost rises.

Costs in the Long Run: Long run is best thought of as a planning horizon.

The Long-Run Average Cost Curve: The curve indicating the lowest average cost of production at each rate of output as the firm size is varied.

- Each short-run average cost curve is tangent to the long-run average cost curve.
- Long-run average cost curves are U-shaped because of economies and diseconomies of scale.

### Economies of Scale

- Forces that reduce a firm's long run average cost as the scale of operation increases.

### Diseconomies of Scale:

Forces that increase a firm's long run average cost as the scale of operation increases

### REVIEW PROBLEMS WITH ANSWERS:-

- 1 (Explicit and Implicit Costs) Amos McCoy is currently raising corn on his 100-acre farm and earning an accounting profit of \$100 per acre. However, if he raised soybeans, he could earn \$200 per acre. Is he currently earning an economic profit? Why or why not?

Amos McCoy is not currently making an economic profit, despite the fact that he is making an accounting profit. This is so, because the accounting profit calculation does not take into account an important implicit cost—the opportunity cost of not raising soybeans. Actually, McCoy is experiencing an economic loss. According to our theory, he should get out of the corn business and begin growing soybeans. This question highlights the important distinction between accounting profit and economic profit.

- 2 (Explicit and Implicit Costs) Determine whether each of the following is an explicit cost or an implicit cost:

- a) Payments for labor purchased in the labor market
  - b) A firm's use of a warehouse that it owns and could rent to another firm
  - c) Rent paid for the use of a warehouse not owned by the firm
  - d) The wages that owners could earn if they did not work for themselves
- a) explicit; b) implicit; c) explicit; d) implicit

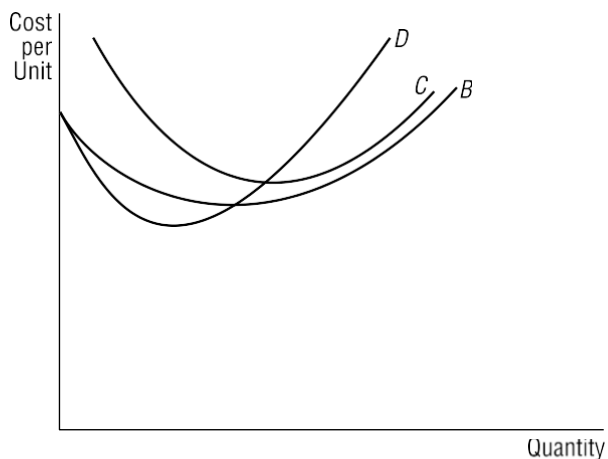
- 3(Production in the Short Run) Complete the following table. At what point does diminishing marginal returns set in?

<u>Units of the Variable Resource</u>	<u>Total Product</u>	<u>Marginal Product</u>
0	0	—
1	10	—
2	22	—
3	—	9
4	—	4
5	34	—

<u>Units of the Variable Resource</u>	<u>Total Product</u>	<u>Marginal Product</u>
0	0	—
1	10	10
2	22	12
3	31	9
4	35	4
5	34	−1

The law of diminishing returns states that, as units of a variable resource are added to fixed quantities of other resources, the resulting increases in total output eventually become smaller and smaller. Diminishing marginal returns occur after the second unit of the variable resource is employed.

- 4 (Costs in the Short Run) Identify each of the curves in the following graph:



B = average variable cost; C = average total cost; D = marginal cost.

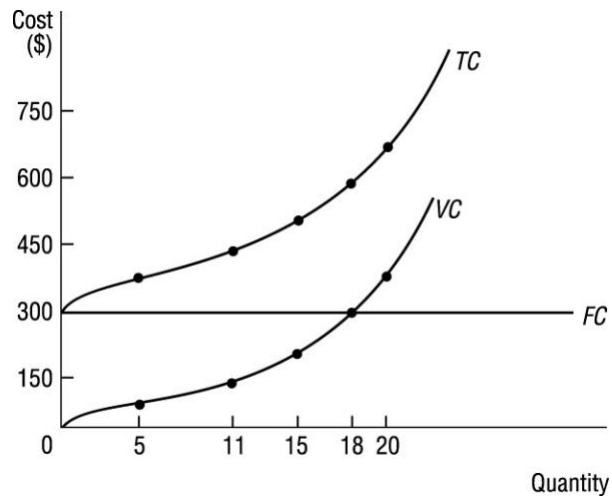
- 5 (Total Cost and Marginal Cost) Complete the following table, assuming that each unit of labor costs \$75 per day.

Quantity of Labor per Day	Output per Day	Fixed Cost	Variable Cost	Total Cost	Marginal Cost
0	\$_____	\$300	\$_____	\$_____	\$_____
1	5	_____	75	_____	15
2	11	_____	150	450	12.50
3	15	_____	_____	525	_____
4	18	_____	300	600	25
5	20	_____	_____	_____	37.50

- Graph the fixed cost, variable cost, and total cost curves for these data.
- What is the marginal product of the third unit of labor?
- What is average total cost when output is 18 units per day?

<u>Quantity of Labor per Day</u>	<u>Output per Day</u>	<u>Fixed Cost</u>	<u>Variable Cost</u>	<u>Total Cost</u>	<u>Marginal Cost</u>
0	0	\$300	\$0	\$300	—
1	5	300	75	375	15
2	11	300	150	450	12.50
3	15	300	225	525	18.75
4	18	300	300	600	25
5	20	300	375	675	37.50

a.



b. The marginal product is 4.

c. The average total cost is \$33.33.

6. (Total Cost and Marginal Cost) Complete the following table, where L is units of labor, Q is units of output, and MP is the marginal product of labor.

<u>L</u>	<u>Q</u>	<u>MP</u>	<u>VC</u>	<u>TC</u>	<u>MC</u>	<u>ATC</u>
0	0	_____	\$ 0	\$12	\$__	\$__
1	6	_____	3	15	_____	_____
2	15	_____	6	_____	_____	_____
3	21	_____	9	_____	_____	_____
4	24	_____	12	_____	_____	_____
5	26	_____	15	_____	_____	_____

- a. At what level of labor input do the marginal returns to labor begin to diminish?
- b. What is the average variable cost when  $Q = 24$ ?
- c. What is this firm's fixed cost?
- d. What is the wage rate per day?

This question demonstrates the relationships between marginal product and marginal costs as well as between marginal and average total costs. The student should supply the missing numbers for MP, TC, MC, and ATC as shown in italics in the following table:

<u>L</u>	<u>Q</u>	<u>MP</u>	<u>VC</u>	<u>TC</u>	<u>MC</u>
0	0	—	\$ 0	\$12	—
1	6	6	3	15	\$0.5
2	15	9	6	18	0.33
3	21	6	9	21	0.5
4	24	3	12	24	1.0
5	26	2	15	27	1.5
6	27	1	18	30	3.0

- Diminishing MP occurs with the third unit of labor.
- When output is 24, total variable cost is \$12. Thus, average variable cost is \$0.50.
- Since total cost is \$12 when output is zero, fixed cost must be \$12.
- Each unit of labor increases VC by \$3, and therefore the wage rate is \$3.

7. (Relationship Between Marginal Cost and Average Cost) Assume that labor and capital are the only inputs used by a firm. Capital is fixed at 5 units, which cost \$100 each. Workers can be hired for \$200 each. Complete the following table to show average variable cost (AVC), average total cost (ATC), and marginal cost (MC).

Quantity of <u>Labor</u>		<u>Total Output</u>	<u>AVC</u>	<u>ATC</u>	<u>MC</u>
0	0	0	\$___	\$___	\$___
1	100	100	___	___	___
2	250	250	___	___	___
3	350	350	___	___	___
4	400	400	___	___	___
5	425	425	___	___	___

Quantity of <u>Labor</u>		<u>Total Output</u>	<u>AVC (VC/Q)</u>	<u>ATC(TC/Q)</u>	<u>MC(ΔTC/ΔQ)</u>
0	0	0	—	—	—
1	100	100	\$2.00	\$7.00	\$2.00
2	250	250	1.60	3.60	1.33
3	350	350	1.70	3.14	2.00
4	400	400	2.00	3.25	4.00
5	425	425	1.18	3.53	8.00



Students must calculate variable cost, which is \$200 per worker, and fixed cost, which is given as 5 units at a cost of \$100 each.

### MODULE-3:- MARKET STRUCTURE AND PRICING STRATEGIES

#### PERFECT COMPETITION MARKET:-

Market structures describe important features of the economic environment in which firms operate. These features include the number of buyers and sellers in the market, the ease or difficulty of entering the market, differences in the product across firms, and the forms of competition among firms.

A perfectly competitive market is characterized by (a) a large number of buyers and sellers, each too small to influence market price; (b) firms in the market supply a commodity, which is a product undifferentiated across producers; (c) buyers and sellers possess full information about the availability and prices of all resources, goods, and technologies; and (d) firms and resources are freely mobile in the long run.

The market price in perfect competition is determined by the intersection of the market demand and market supply curves. Each firm then faces a demand curve that is a horizontal line at the market price. The firm's demand curve also indicates the average revenue and marginal revenue received at each rate of output. Firms in perfect competition are said to be price takers because no firm can influence the market price. Each firm can vary only the amount it supplies at that price.

For a firm to produce in the short run, rather than shut down, the market price must at least cover the firm's average variable cost. If price is below average variable cost, the firm shuts down. That portion of the marginal cost curve at or rising above the average variable cost curve becomes the perfectly competitive firm's short-run supply curve. The horizontal sum of each firm's supply curve forms the market supply curve. As long as price covers average variable cost, each perfectly competitive firm maximizes profit or minimizes loss by producing where marginal revenue equals marginal cost.

Because firms are not free to enter or leave the market in the short run, economic profit or loss is possible. In the long run, however, firms enter or leave the market and otherwise adjust their scale of operation until any economic profit or loss is eliminated.

Competition drives each firm in the long run to produce at the lowest point on its long-run average cost curve. At this rate of output, marginal revenue equals marginal cost and each also equals the price and average cost. Firms that fail to produce at this least-cost combination do not survive in the long run.

In the short run, a firm's change in quantity supplied is shown by moving up or down its marginal cost, or supply, curve. In the long run, firms enter or leave the market and existing firms may change their scale of operation until firms still in the industry earn just a normal profit. As the industry expands or contracts in the long run, the long-run industry supply curve has a shape that reflects either constant costs or increasing costs.

Perfectly competitive markets exhibit both productive efficiency (because output is produced using the most efficient combination of resources available) and allocative efficiency (because the goods produced are those most valued by consumers). In equilibrium, a perfectly competitive market allocates goods so that the marginal cost of the final unit produced equals the marginal value that consumers attach to that final unit. In the long run, market pressure minimizes the average cost of production. Voluntary exchange in competitive markets maximizes the sum of consumer surplus and producer surplus, thus maximizing social welfare.

### An Introduction to Perfect Competition

- Perfectly Competitive Market Structure: A perfectly competitive market:
  - Has many buyers and sellers.
  - Sells a commodity or standardized product.
  - Has buyers and sellers who are fully informed.
  - Has firms and resources that are freely mobile.
- Perfectly competitive firm: A price taker; has no control over price.
- Demand Under Perfect Competition: Horizontal line at the market price

## Short-Run Profit Maximization

Total Revenue Minus Total Cost: The firm maximizes economic profit by finding the rate of output at which total revenue exceeds total cost by the greatest amount. □

### Marginal Revenue Equals Marginal Cost in Equilibrium

- Marginal Revenue: The change in total revenue from selling another unit of output:
- $MR = \Delta TR / \Delta q$
- In perfect competition, marginal revenue equals market price.
- The firm increases output as long as marginal revenue exceeds marginal cost.
- Golden rule of profit maximization: The firm maximizes profit by producing where marginal cost equals marginal revenue.

### Economic Profit in the Short Run

Market price = Marginal revenue = Average revenue

### Minimizing Short-Run Losses

Short run: A period too short to allow existing firms to leave the industry.

- Fixed Costs and Minimizing Losses: If a firm shuts down, it must still pay fixed costs. A firm produces if total revenue exceeds the variable cost of production.
- Marginal Cost Equals Marginal Revenue: The firm produces rather than shuts down if there is some rate of output where the price at least covers average variable cost. This minimizes the short-run loss.
- Shutting Down in the Short Run: Shut down if average variable cost exceeds price at all rates of output since this minimizes loss.
- Fixed costs are a sunk cost in the short run

### The Firm and Industry Short-Run Supply Curves

Short-Run Firm Supply Curve: That portion of a firm's marginal cost curve that intersects and rises above the low point on its average variable cost curve.

Short-Run Industry Supply Curve: Sums horizontally each firm's short-run supply curve.

Firm Supply and Market Equilibrium: Each perfectly competitive firm selects the short-run output that maximizes profit or minimizes loss.

## Perfect Competition in the Long Run

- Zero Economic Profit in the Long Run

Entry or exit of firms drives economic profit to zero so firms earn only a normal profit.

- The Long-Run Adjustment to a Change in Demand
  - Effects of an Increase in Demand: Increase in demand results in an increase in market price. This draws new firms to enter the market which causes supply to increase pushing prices down.
  - Effects of a Decrease in Demand: Decrease in demand results in a decrease in market prices.
  - Market output falls. Short run losses will eventually drive firms out of industry causing a reduction in supply.

The Long-Run Industry Supply Curve: Shows the relationship between price and quantity supplied once firms fully adjust to any short-term economic profit or loss resulting from a change in demand.

- Constant-Cost Industries: Horizontal supply curve; resource prices and other production costs remain constant as output expands.
- Increasing-Cost Industries: Upward-sloping supply curve; resource prices and other production costs increase as output expands.

## Perfect Competition and Efficiency

- Productive Efficiency: Produce output at the minimum of the long-run average cost curve. Making stuff right but maybe making the wrong stuff.
- Allocative Efficiency: Produce the output that consumers value most. Produce where marginal benefit equals marginal cost. Not only making stuff right but making the right stuff.

## What's So Perfect About Perfect Competition?

- Gains from voluntary exchange through competitive markets:
- Consumer Surplus: Most consumers would be willing and able to pay for each good exceeds what they actually do pay.
- Producer Surplus: Total revenue minus variable costs.

## LEARNING OUTCOMES

### 1 Define a perfectly competitive market and explain its effect on demand

Market structures describe important features of the economic environment in which firms operate. A firm's decisions about how much to produce or what price to charge depend on the

structure of the market. Perfect competition is the most basic of market structures; if it exists, an individual buyer or seller has no control over the price. Price is determined by market demand and supply.

## 2 Explain how firms maximize profit in the short run

All firms try to maximize economic profit, which is any profit above normal profit. Firms maximize profit by controlling their rate of output. Subtracting total cost from total revenue is one way to find the profit-maximizing output. Another way to find the profit-maximizing rate of output is to focus on marginal revenue and marginal cost. On a perfectly competitive firm's demand curve, market price, marginal revenue, and average revenue are all equal.

## 3 Identify ways firms minimize short-run losses

Firms that have not identified a profitable level of output can either operate at a loss or shut down. Shutting down is not the same as going out of business. In the short run, even a firm that shuts down keeps productive capacity intact by continuing to pay fixed costs, which are sunk whether the firm produces or shuts down. For a firm to produce in the short run, rather than shut down, the market price must at least cover the firm's average variable cost.

## 4 Explain how firms manage short-run supply

If price exceeds average variable cost, the firm produces the quantity at which marginal revenue equals marginal cost. A firm changes the rate of output if the market price changes. As long as the price covers average variable cost, the firm supplies the quantity at which the upward-sloping marginal cost curve intersects the marginal revenue, or demand, curve. Individual firm supply curves can be summed to yield the market, or industry supply curve. A perfectly competitive firm supplies the short-run quantity that maximizes profit or minimizes loss. When confronting a loss, a firm either produces an output that minimizes that loss or shuts down temporarily. Given the conditions for perfect competition, the market converges toward the equilibrium price and quantity.

## 5 Describe how taking the long-run view affects economic factors

In the long run, firms enter and leave the market, adjust the scale of operations, and experience no distinction between fixed and variable cost. Short-run economic profit attracts new entrants in the long run and may cause existing firms to expand. Market supply thereby increases, driving down the market price until economic profit disappears. When market demand decreases, firms incur short-run losses and may go out of business in the long run. This results in lower market output and reduced operational scale which increases each remaining firm's long-run average cost.

## 6 Describe how different cost structures influence an industry's long-run supply curve

In a constant-cost industry, each firm's long-run average cost curve does not shift up or down as industry output changes; each firm's per-unit costs are independent of the number of firms in the industry. The firms in some industries encounter higher average costs as industry output expands in the long run. Expanding output bids up the prices of some resources or otherwise increases per-unit production costs, and these higher costs shift up each firm's cost curves.

## 7 Identify how concepts of efficiency are used to judge market performance

Perfectly competitive markets exhibit both productive efficiency (because output is produced using the most efficient combination of resources available) and allocative efficiency (because the goods produced are those most valued by consumers). In equilibrium, a perfectly competitive market allocates goods so that the marginal cost of the final unit produced equals the marginal value that consumers attach to that final unit. In the long run, market pressure minimizes the average cost of production. Voluntary exchange in competitive markets maximizes the sum of consumer surplus and producer surplus, thus maximizing social welfare.

### MONOPOLY MARKET:-

A monopolist sells a product with no close substitutes. Short-run economic profit earned by a monopolist can persist in the long run only if the entry of new firms is blocked. Three barriers to entry are (a) legal restrictions, such as patents and operating licenses; (b) economies of scale over a broad range of output; and (c) control over a key resource.

Because a monopolist is the sole supplier of a product with no close substitutes, a monopolist's demand curve is also the market demand curve. Because a monopolist that does not price discriminate can sell more only by lowering the price for all units, marginal revenue is less than the price. Where demand is price elastic, marginal revenue is positive and total revenue increases as the price falls. Where demand is price inelastic, marginal revenue is negative and total revenue decreases as the price falls. A monopolist never voluntarily produces where demand is inelastic because raising the price and reducing output would increase total revenue.

If the monopolist can at least cover variable cost, profit is maximized or loss is minimized in the short run by finding the output rate that equates marginal revenue with marginal cost. At the profit-maximizing quantity, the price is found on the demand curve.

In the short run, a monopolist, like a perfect competitor, can earn economic profit but will shut down unless price at least covers average variable cost. In the long run, a monopolist, unlike a perfect competitor, can continue to earn economic profit as long as entry of potential competitors is blocked.

If costs are similar, a monopolist charges a higher price and supplies less output than does a perfectly competitive industry. Monopoly usually results in a deadweight loss when compared with perfect competition because the loss of consumer surplus exceeds the gains in monopoly profit.

To increase profit through price discrimination, the monopolist must have at least two identifiable groups of customers, each with a different price elasticity of demand at a given price, and must be able to prevent customers charged the lower price from reselling to those charged the higher price.

A perfect price discriminator charges a different price for each unit sold, thereby converting all consumer surplus into economic profit. Perfect price discrimination seems unfair because the monopolist reaps maximum profit and consumers get no consumer surplus. Yet perfect price discrimination is as efficient as perfect competition because the monopolist has no incentive to restrict output, so there is no deadweight loss.

## AN OVERVIEW OF MONOPOLY MARKET

Barriers to Entry: Restrictions on entry of new firms into an industry.

Legal Restrictions

### **Patents and Invention Incentives**

— Patent: Awards exclusive right to produce a good or service for 20 years.

### **Licenses and Other Entry Restrictions**

— Government sometimes confers monopoly rights.

Economies of Scale: Natural monopolies emerge from the nature of costs.

- Downward-sloping long-run average cost curve.
- A single firm can satisfy market demand at a lower average cost per unit than could two or more firms.
- Control of Essential Resources: Source of monopoly power is a firm's control over some resource critical to production.
- Revenue for the Monopolist
- Demand, Average Revenue, and Marginal Revenue: the demand curve for the monopolist's output slopes downward; the demand curve is also the monopolist's average revenue curve.
- The Gains and Loss from Selling One More Unit: additional units lead to a gain from selling one more unit but also a loss from lowering price on all units sold. Thus, marginal revenue is less than price.

Revenue Schedules: As output increases, total revenue increases, reaches a maximum and then declines.

- Marginal revenue: As price declines, marginal revenue falls because:
  - The amount of revenue received from selling an additional unit declines.
  - The revenue forgone by selling all units at this lower price grows.

Revenue Curves: Total revenue reaches a maximum where marginal revenue is zero.

- Where demand is elastic:
  - Marginal revenue is positive.
  - Total revenue increases as price falls.
- Where demand is inelastic:
  - Marginal revenue is negative.
  - Total revenue decreases as price falls.
  - The Firm's Costs and Profit Maximization: The monopolist is a –price maker.¶
  - Profit Maximization:
    - Total Revenue Minus Total Cost: Production rate where total revenue exceeds total cost by the greatest amount.
    - Marginal Revenue Equals Marginal Cost
  - Graphical Solution: The profit-maximizing rate of output is found where the upward-sloping marginal cost curve intersects the marginal revenue curve. The price the monopolist can charge is limited by consumer demand.
  - Short-Run Losses and the Shutdown Decision: Continue producing if the price is greater than average variable cost. Shutdown if the price does not cover average variable cost.
  - Long-Run Profit Maximization: Barriers to entry can allow economic profit to persist in the long run.
  - Monopoly and the Allocation of Resources
  - Price and Output Under Perfect Competition: Marginal benefit that consumers derive from a good equals the marginal cost of producing that good. The market is allocatively efficient and maximizes social welfare.
  - Price and Output Under Monopoly: While producing to maximize profit where marginal cost equals marginal revenue, the monopolist charges a higher price and supplies less output than a perfect competitor. Consumer surplus still exists, only in smaller amounts. Social welfare is not maximized.
  - Allocative and Distributive Effects: Consumer surplus is smaller under monopoly. Some of this loss in consumer surplus is redistributed to the monopolist, but some is a deadweight loss, or welfare loss, that is gained by no one.

–



- Problems Estimating the Deadweight Loss of Monopoly
- Why the Deadweight Loss of Monopoly Might Be Lower: Monopolists might be able to produce output at a lower cost than competitive firms. However, fear of public scrutiny and political pressure may not let monopoly price rise as high as it could.
- Why the Deadweight Loss of Monopoly Might Be Higher: Resources used by the monopolist to secure and maintain a monopoly position may create more of a welfare loss than simple models suggest. Insulated from competition, the monopolist may become inefficient.

### Price Discrimination

- Price discrimination: Charging different prices for the same output to different groups of consumers.

Conditions for Price Discrimination: The monopolist must:

- Be a price maker.
- Identify at least two classes of consumers with different price elasticities of demand.
- Be able, at little cost, to charge each group a different price for essentially the same product.
- Have a way to prevent those consumers charged the lower price from reselling to those who pay the higher price.

A Model of Price Discrimination: Profit is maximized by charging a lower price to the group with the more elastic demand.

Examples of Price Discrimination:

- Business versus household travel on airlines.
- IBM laser printer for business versus home.
- Amusement parks
- Adobe Photoshop vs. Photoshop Elements

Perfect Price Discrimination: The Monopolist's Dream

- Charge a different price for each unit of a good.
- Converts every dollar of consumer surplus into economic profit.

## LEARNING OUTCOMES

### 1 List and describe barriers to market entry

A monopolist sells a product with no close substitutes. Short-run economic profit earned by a monopolist can persist in the long run only if the entry of new firms is blocked. Three barriers to entry are (a) legal restrictions, such as patents and operating licenses; (b) economies of scale over a broad range of output; and (c) control over a key resource.

## 2 Explain sources of revenue for the monopolist

Because a monopolist is the sole supplier of a product with no close substitutes, a monopolist's demand curve is also the market demand curve. Because a monopolist that does not price discriminate can sell more only by lowering the price for all units, marginal revenue is less than the price. Where demand is price elastic, marginal revenue is positive and total revenue increases as the price falls. Where demand is price inelastic, marginal revenue is negative and total revenue decreases as the price falls. A monopolist never voluntarily produces where demand is inelastic because raising the price and reducing output would increase total revenue.

## 3 Describe a firm's costs and its opportunities for profit maximization

If the monopolist can at least cover variable cost, profit is maximized or loss is minimized in the short run by finding the output rate that equates marginal revenue with marginal cost. At the profit-maximizing quantity, the price is found on the demand curve.

## 4 Explain monopoly and the allocation of resources

If costs are similar, a monopolist charges a higher price and supplies less output than does a perfectly competitive industry. Monopoly usually results in a deadweight loss when compared with perfect competition because the loss of consumer surplus exceeds the gains in monopoly profit.

## 5 Describe the problems that interfere with estimating the deadweight loss of a monopoly

Deadweight loss can be difficult to estimate. If economies of scale are substantial enough, a monopolist might be able to produce output at a lower cost per unit than could competitive firms. The price, or at least the cost of production, could be lower under monopoly than under competition and deadweight loss may overstate the true cost of monopoly. Alternatively, the deadweight loss of monopoly might, in fact, be greater than shown in our simple diagram. If resources must be devoted to securing and maintaining a monopoly position, monopolies may impose a greater welfare loss than simple models suggest.

## 6 Describe conditions that create price discrimination

To increase profit through price discrimination, the monopolist must have at least two identifiable groups of customers, each with a different price elasticity of demand at a given price, and must be able to prevent customers charged the lower price from reselling to those charged the higher price. A perfect price discriminator charges a different price for each unit sold, thereby converting all consumer surplus into economic profit. Objectively, price discrimination is as efficient as perfect competition because the monopolist has no incentive to restrict output, so there is no deadweight loss.

## MONOPOLISTIC COMPETITION AND OLIGOPOLY:-

Whereas the output of a monopolist has no close substitutes, a monopolistic competitor must contend with many rivals. But because of differences among the products offered by different firms, each monopolistic competitor faces a downward-sloping demand curve.

Sellers in monopolistic competition and in oligopoly differentiate their products through (a) physical qualities, (b) sales locations, (c) services offered with the product, and (d) the product image.

In the short run, monopolistic competitors that can at least cover their average variable costs maximize profits or minimize losses by producing that quantity where marginal revenue equals marginal cost. In the long run, easy entry and exit of firms means that a monopolistic competitor earns only a normal profit, which occurs where the average total cost curve is tangent to the downward-sloping demand curve for the firm's product.

An oligopoly is an industry dominated by a few sellers. In undifferentiated oligopolies, such as steel or oil, the product is a commodity—meaning that it does not differ across firms. In differentiated oligopolies, such as automobiles or breakfast cereals, the product differs across firms.

Because an oligopoly consists of just a few firms, each may react to another firm's changes in quality, price, output, services, or advertising. Because of this interdependence, the behavior of oligopolists is difficult to analyze. No single approach characterizes all oligopolistic markets.

In this perspective, we considered three approaches to oligopoly behavior: (a) collusion, in which firms form a cartel to act collectively like a monopolist; (b) price leadership, in which one firm, usually the biggest one, sets the price for the industry and other firms follow the leader; and (c) game theory, which analyzes oligopolistic behavior as a series of strategic moves by rival firms.

The prisoner's dilemma game shows why each player has difficulty cooperating even though all players would be better off if they did. In a variety of decisions such as what price to charge and how much to spend on marketing, rival firms could increase profit by cooperating. Yet each faces incentives that encourage noncooperation.

## A BIRD'S EYE VIEW ON MONOPOLISTIC COMPETITION AND OLIGOPOLY

**Monopolistic Competition:** This section relies on Edward Chamberlin's model.

**Characteristics of Monopolistic Competition:** A market structure characterized by a large number of firms selling products that are close substitutes, yet different enough that each firm's demand curve slopes downward. Each supplier is a price maker. Barriers to entry are low and firms can enter or leave the industry in the long run. Sellers also behave competitively.

### **Product Differentiation**

**Physical Differences:** Physical appearance and qualities.

**Location:** The number and variety of locations where product is available.

**Services:** Accompanying services provided.

**Product Image:** Image producer tries to convey to the buyer about the product's quality.

Short-Run Profit Maximization or Loss Minimization: Elasticity of demand for a monopolistic competitor depends on the number of rival firms and the firm's ability to differentiate its product.

**Marginal Revenue Equals Marginal Cost:** Monopolistic competition maximizes profit in the short run just as a monopolist does. Profit maximizing quantity is where marginal revenue equals marginal cost; profit maximizing price for that quantity is found on the demand curve.

**Maximizing Profit or Minimizing Loss in the Short Run:** As long as the price is at or above average variable cost, the firm should produce in the short run.

Zero Economic Profit in the Long Run: Because market entry is easy, monopolistically competitive firms earn zero economic profit in the long run. Monopolistically competitive firms spend large amounts on advertising, which contributes to an increase in average costs.

Monopolistic Competition and Perfect Competition Compared: If the two types of firms have the same cost curves, the monopolistic competitor produces less and charges more than the perfect competitor, exhibiting excess capacity in the long run.

An Introduction to Oligopoly: An industry characterized by just a few firms whose behavior is interdependent.

Varieties of Oligopoly: In some industries the product is homogeneous; in others, it is differentiated across producers.

- Undifferentiated Oligopolies: Sells a commodity.
  - Differentiated Oligopolies: Sells products that differ across producers.
- Economies of Scale: If a firm's minimum efficient scale is relatively large compared to industry output, only a few firms are needed to satisfy industry demand.

High Cost of Entry: High start-up costs and established brand names deter new entrants.

Crowding Out the Competition: Multiple products from the same brand crowd out new entrants.

Models of Oligopoly: Because oligopolists are interdependent, no one general theory of oligopoly explains their behavior, but several theories have been developed.

Collusion and Cartels:

- Collusion is an agreement among firms in the industry to divide the market and to fix the price.
- A cartel is a group of firms that agree to collude, thus they act as a monopoly.
- Effective functioning of a cartel is complicated by:
  - Differences in Cost:** If average costs differ across firms, output allocation that maximizes cartel profit yields unequal profits for cartel members.

**Number of Firms in the Cartel:** Consensus becomes harder to achieve as the number of firms in the cartel grows.

**New Entry into the Industry:** New entrants increase market supply, thus driving prices down. Therefore, a cartel's success depends on barriers that block entry of new firms.

**Cheating:** Powerful temptation to cheat on agreement undermines cartels.

—Price Leadership: A price leader is a firm whose price is adopted by the rest of the industry.

—Obstacles:

—violates U.S. antitrust laws;

—the greater the product differentiation, the less effective price leadership is;

—no guarantee other firms will follow;

—profitable prices attract new entrants so barriers to entry are needed; and,

—temptation to cheat.

Game Theory: a model that analyzes oligopolistic behavior as a series of strategic moves and countermoves by rival firms.

- Prisoner's Dilemma: a game that shows why players have difficulty cooperating even when both players would benefit from cooperation.
- Strategy: In game theory, the operational plan pursued by a player.
- Payoff matrix: In game theory, a table listing the payoffs that each player can expect based on the combination of strategies that each player pursues.
- Dominant-strategy equilibrium: the outcome achieved when each player's choice does not depend on what he thinks the other player will do.
- Price-Setting Game: Applies the prisoner's dilemma to pricing strategies.

One shot versus repeated games

One shot: Prisoner's dilemma strategy.

Repeated game: Tit for Tat Strategy.

Coordination Game: Nash equilibrium

Summary of Oligopoly Models: Each model helps explain a phenomenon observed in oligopolistic markets.

Comparison of Oligopoly and Perfect Competition: There is no single model of oligopoly.

**Price Is Usually Higher under Oligopoly: Price is usually higher and output lower under an oligopoly.**

**Higher Profits under Oligopoly: Profit in the long run should be higher under oligopolies than under perfect competition.**

## LEARNING OUTCOMES

### 1 Discuss factors that lead to monopolistic competition

Monopolistic competition describes a market in which many producers offer products that are substitutes but are not viewed as identical by consumers. Product differentiation allows each supplier some power over the price it can charge. Because barriers to entry are low, there are enough sellers that they behave competitively and act independently.

Monopolistic competition contains elements of both monopoly and competition. Monopolistic competition is like monopoly in the sense that firms in each industry face demand curves that slope downward. Monopolistic competition is like perfect competition in the sense that easy entry and exit eliminate economic profit or economic loss in the long run.

### 2 Explain the concept of oligopoly

An oligopoly is an industry dominated by just a few firms. Oligopolists are said to be interdependent since each one must consider the effect of its own actions on competitors' behavior. The formation of an oligopoly can often be traced to some form of barrier to entry, such as economies of scale, legal restrictions, brand names built up by years of advertising, or control over an essential resource.

### 3 Describe models of oligopoly

There is no general theory of oligopoly but rather a set of theories, each based on the diversity of observed behavior in an interdependent market. The theories that are used to explain oligopoly behavior are collusion, price leadership, and game theory. These models identify formal and informal efforts to collude and the strategic decision-making process that firms employ when collusion does not occur.

### 4 Explain how game theory helps predict cartel behavior

Game theory examines oligopolistic behavior as a series of strategic moves and countermoves among rival firms. This approach analyzes the behavior of decision makers, or players, whose choices affect one another. While participation in a cartel would result in higher economic profits, game theory explains why the incentives to cheat are so great that firms often act in ways that result in lower profits.

### 5 Compare oligopoly and perfect competition

With monopolistic competition, there are so many firms in the market that each behaves independently. But with oligopoly, there are so few firms in the market that each must consider

the impact its pricing, output, and marketing decisions will have on other firms. Each oligopolist behaves interdependently, and this makes oligopoly difficult to analyze. In general, price and profits are usually higher under oligopoly.

#### REVIEW PROBLEMS WITH ANSWERS:-

- 1.(Market Structure) Define market structure. What factors are considered in determining the market structure of a particular industry?

Market structure refers to the important features that determine the level of competition in an industry. These factors include (a) the number of buyers and sellers, (b) the product's degree of uniformity, (c) the ease with which new firms enter or old firms exit the market, and (d) the ways in which firms in the industry compete with each other—such as through prices or advertising.

2. (Demand Under Perfect Competition) What type of demand curve does a perfectly competitive firm face? Why?

The perfectly competitive firm faces a demand curve that is horizontal at the prevailing market price. This is the result of firms in the industry producing a commodity. No individual firm would want to raise its price above its competitors' prices—which is the market price. If it raised them, its customers would switch all of their purchases to competing firms, and the first firm's sales would drop to zero.

- 3.(Short-Run Profit Maximization) A perfectly competitive firm has the following fixed and variable costs in the short run. The market price for the firm's product is \$150.

<u>Output</u>	<u>FC</u>	<u>VC</u>	<u>TC</u>	<u>TR</u>	<u>Profit/Loss</u>
0	\$100	\$ 0	_____	_____	_____
1	100	100	_____	_____	_____
2	100	180	_____	_____	_____
3	100	300	_____	_____	_____
4	100	440	_____	_____	_____
5	100	600	_____	_____	_____
6	100	780	_____	_____	_____

- a. Complete the table.
- b. At what output rate does the firm maximize profit or minimize loss?
- c. What is the firm's marginal revenue at each positive level of output? Its average revenue?
- d. What can you say about the relationship between marginal revenue and marginal cost for output rates below the profit-maximizing (or loss-minimizing) rate? For output rates above the profit-maximizing (or loss-minimizing) rate?

a.

<u>Output</u>	<u>FC</u>	<u>VC</u>	<u>TC</u>	<u>TR</u>	<u>Profit/Loss</u>
0	\$100	\$ 0	\$100	\$ 0	\$-100
1	100	100	200	150	-50
2	100	180	280	300	20
3	100	300	400	450	50
4	100	440	540	600	60
5	100	600	700	750	50
6	100	780	880	900	20

- b. Profit is maximized at four units of output.
- c. Both marginal revenue and average revenue equal \$150 at all output levels above zero.
- d. Have students calculate marginal cost and marginal revenue so they can see where marginal revenue exceeds the marginal cost. Marginal revenue exceeds marginal cost for output units below 4; marginal cost exceeds marginal revenue for output units above 4.



4. Explain the different options a firm has to minimize losses in the short run.

A firm in the short run is limited in its options, as the short run by definition is not enough time for that firm to leave the industry. The firm can either continue to produce at a loss or temporarily shut down. The decision depends on the two types of costs a firm faces in the short run: fixed costs and variable costs. Fixed costs must be paid even if the firm produces nothing; variable costs, such as labor, depend on the quantity produced. A firm will continue to produce rather than shut down if total revenue exceeds the variable cost of production.

- 5.(The Short-Run Firm Supply Curve) Use the following data to answer the questions below:

<u>Q</u>	<u>VC</u>	<u>MC</u>	<u>AVC</u>	
1	\$10	—	—	
2	16	—	—	
3	20	—	—	
4	25	—	—	
5	31	—	—	
6		38	—	—
7		46	—	—
8		55	—	—
9		65	—	—

- Calculate the marginal cost and average variable cost for each level of production.
- How much would the firm produce if it could sell its product for \$5? For \$7? For \$10?
- Explain your answers.
- Assuming that its fixed cost is \$3, calculate the firm's profit at each of the production levels determined in part (b).

For the answers to part a, see columns MC and AVC, respectively, in the following table:

<u>Q</u>	<u>VC</u>	<u>MC</u>	<u>AVC</u>
1	\$10	\$10	\$10.00
2	16	6	8.00
3	20	4	6.67
4	25	5	6.25
5	31	6	6.20
6	38	7	6.33
7	46	8	6.57
8	55	9	6.88
9	65	10	7.22

- b. & c. When price (P) equals \$5, producing where  $MC = P$  means that  $Q = 4$ . However, the price of \$5 does not cover average variable cost here. So the firm is better off shutting down and producing nothing because, if  $Q = 0$ , losses are only its fixed costs. At \$7,  $MC = P$  when  $Q = 6$ . At \$10,  $MC = P$  when  $Q = 9$ . The firm is covering its costs at both of these prices, so it should stay in business.

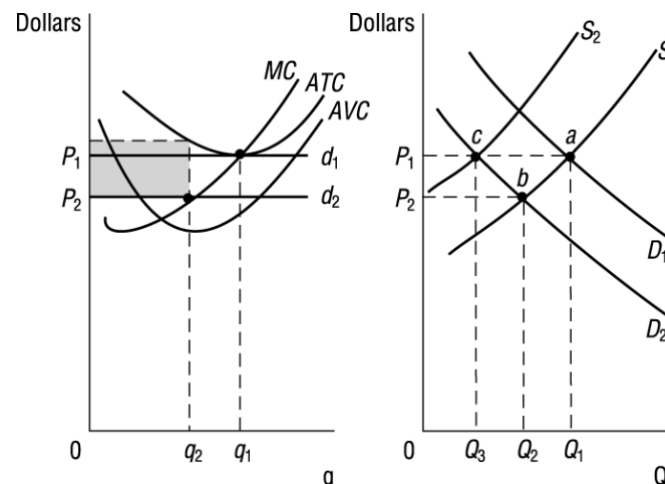
- d. When  $P = \$5$ , profit =  $-\$3$  because only fixed costs are being paid.

When  $P = \$7$ , profit =  $\$42 - 41 = \$1$ .

When  $P = \$10$ , profit =  $\$90 - 68 = \$22$ .

6. (The Short-Run Firm Supply Curve) Each of the following situations could exist for a firm in the short run. In each case, indicate whether the firm should produce in the short run or shut down in the short run, or whether additional information is needed to determine what it should do in the short run.
- a. Total cost exceeds total revenue at all output levels.
  - b. Total variable cost exceeds total revenue at all output levels.
  - c. Total revenue exceeds total fixed cost at all output levels.
  - d. Marginal revenue exceeds marginal cost at the current output level.
  - e. Price exceeds average total cost at all output levels.
  - f. Average variable cost exceeds price at all output levels.
  - g. Average total cost exceeds price at all output levels.
- a. Need additional information. Information regarding FC and/or VC is required. If a portion of the firm's FC is being covered, it can remain open but operate at a loss. If none of the FC are being met, the firm would need to shut down.
- b. Shut down in the short run.
- c. Need additional information. Information regarding how much the TR exceeds TC is required. TR needs to exceed TC by the greatest amount.
- d. Expand output.
- e. Produce in the short run.
- f. Shut down in the short run.
- g. Need additional information. Information regarding FC and/or VC is required. If a portion of the firm's FC is being covered, it can remain open but operate at a loss. If none of the FC are being met, the firm would need to shut down.
7. (The Long-Run Industry Supply Curve) A normal good is being produced in a constant-cost, perfectly competitive industry. Initially, each firm is in long-run equilibrium.

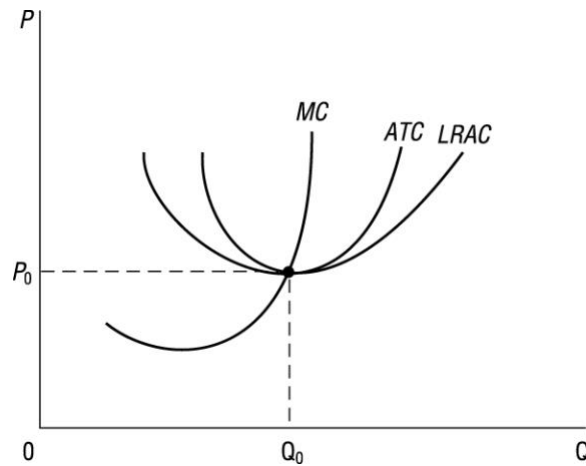
- a. Graphically illustrate and explain the short-run adjustments for the market and the firm to a decrease in consumer incomes. Be sure to discuss any changes in output levels, prices, profits, and the number of firms.
- b. Next, show on your graph and explain the long-run adjustment to the income change. Be sure to discuss any changes in output levels, prices, profits, and the number of firms.
- a. In the right panel of the following graph, the drop in consumer incomes decreases market demand from  $D_1$  to  $D_2$ . This lowers the market price from  $P_1$  to  $P_2$  and market output from  $Q_1$  to  $Q_2$ , as the market adjusts from point a to point b. In the left panel, the demand curve facing each firm drops from  $d_1$  to  $d_2$ . Assuming that a firm can still cover its variable costs (as shown in the left panel), it continues to operate, but at a loss. The firm's output drops from  $q_1$  to  $q_2$  (where the new demand or marginal revenue curve intersects the marginal cost curve), and it suffers losses equal to the shaded area. In the short run, there is no change in the number of firms.



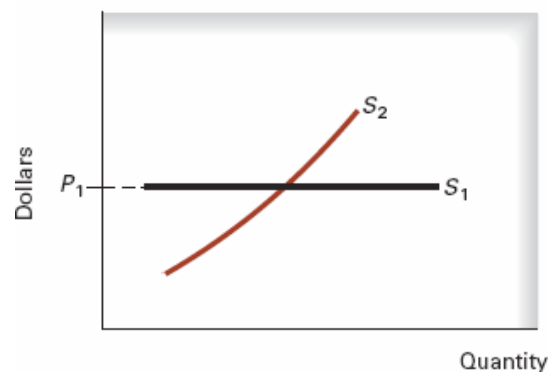
- b. In the long run, economic losses cause some firms to exit the industry, decreasing market supply. Firms exit and supply decreases until losses are eliminated. In a constant-cost industry, the market price returns to its original level of  $P_1$ . The supply curve shifts to  $S_2$  in the right panel, and the market adjusts from point b to point c. The firm's demand curve returns to its original position as the price rises. Output levels of the remaining firms return to their original levels. Market output drops to  $Q_3$  due to a decrease in the number of firms.
8. (Long-Run Industry Supply) Why does the long-run industry supply curve for an increasing-cost industry slope upward? What causes the increasing costs in an increasing-cost industry?

The long-run supply curve in an increasing-cost industry is upward sloping because resource prices rise as existing firms increase their scale of operation and as new firms enter. If market demand increases, price is bid up and economic profits are made in the short run. These economic profits attract new firms to the market, and existing firms may expand. But to produce their output, firms need resources. If the total demand for resources increases significantly, resource prices are bid up for each firm in the industry. This causes an upward shift of the average total cost curve, consistent with a higher equilibrium price at the point of zero profit.

9. (Perfect Competition in the Long Run) Draw the short- and long-run cost curves for a competitive firm in long-run equilibrium. Indicate the long-run equilibrium price and quantity.
- Discuss the firm's short-run response to a reduction in the price of a variable resource.
  - Assuming that this is a constant-cost industry, describe the process by which the industry returns to long-run equilibrium following a change in market demand.



- A reduction in a resource price shifts all cost curves downward. Assuming a vertical shift, output increases for each firm in the short run as the firm produces where price equals the new (short-run) marginal cost.
  - The lower production costs create positive short-run profits for each firm. This encourages the entry of new firms into the industry. Expanded output by existing firms, plus the output of the new firms, increase supply, creating downward pressure on the market price. This lowers each firm's demand, average revenue, and marginal revenue curves. Entry and expansion continue until the price just equals the minimum point of the average cost curves—that is, until economic profit becomes zero.
10. (The Long-Run Industry Supply Curve) The following graph shows possible long-run market supply curves for a perfectly competitive industry. Determine which supply curve indicates a constant-cost industry and which an increasing-cost industry.



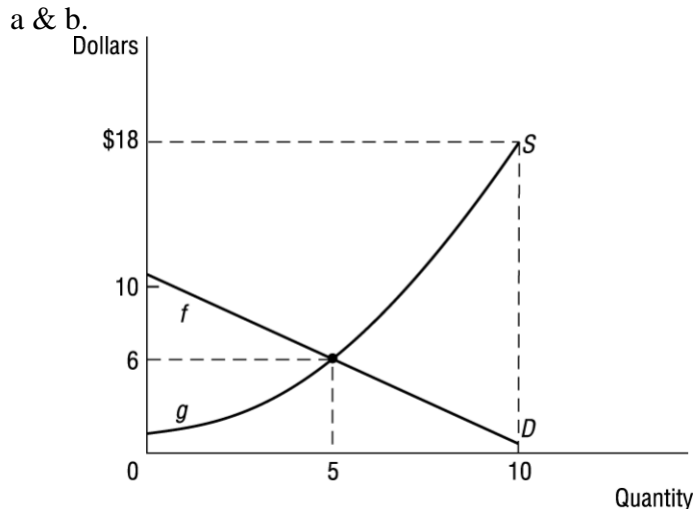
- a. Explain the difference between a constant-cost industry and an increasing-cost industry.
- b. Distinguish between the long-run impact of an increase in market demand in a constant-cost industry and the impact in an increasing-cost industry.

$S^1$  = constant cost;  $S^2$  = increasing cost

- a. A constant-cost industry uses such a small portion of the resources available that increasing output does not increase production costs. The average cost curve does not shift up or down. In an increasing-cost industry, the entry of new firms drives up resource prices and increases production costs. Therefore, each firm's average total cost curve rises, and the price that provides a normal profit rises.
  - b. A constant-cost industry will not feel the impact of an increase in demand. Because the amount of resources employed is such a small portion of what is available, the increase in demand will not cause resource prices to rise. In an increasing-cost industry, an increase in market demand generates short-run economic profits, encouraging new firms to enter the industry.
11. (What's So Perfect About Perfect Competition?) Use the following data to answer the questions.

<u>Quantity</u>	<u>Marginal Cost</u>	<u>Marginal Benefit</u>	
0		—	—
1		\$2	\$10
2		\$3	9
3		\$4	8
4		\$5	7
5		\$6	6
6		\$8	5
7		\$10	4
8		\$12	3

- a. For the product shown, assume that the minimum point of each firm's average variable cost curve is at \$2. Construct a demand and supply diagram for the product and indicate the equilibrium price and quantity.
- b. On the graph, label the area of consumer surplus as f. Label the area of producer surplus as g.
- c. If the equilibrium price were \$2, what would be the amount of producer surplus?



c. Producer surplus would drop to zero.

12. (Barriers to Entry) Explain how economies of scale can be a barrier to entry.

If a firm's long-run average cost curve slopes downward throughout the range of market demand, a single firm can produce at a lower average cost than any other firm that tries to enter the market. As firms compete to increase their market shares by expanding and thus lowering cost and price, a single firm emerges naturally from the process. Any new firm trying to enter the market is unable to match the monopolist's economies of scale and, therefore, is unable to match the monopolist's price.

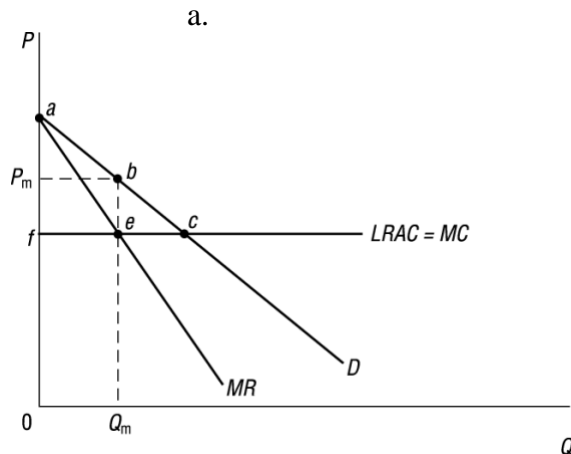
13. (Monopoly) Suppose that a certain manufacturer has a monopoly on the sorority and fraternity ring business (a constant-cost industry) because he has persuaded the -Greeks to give it exclusive rights to their insignia.

a. Using demand and cost curves, draw a diagram depicting the firm's profit-maximizing price and output level.

b. Why is marginal revenue less than price for this firm?

c. On your diagram, show the deadweight loss that occurs because the output level is determined by a monopoly rather than by a competitive market.

d. What would happen if the Greeks decided to charge the manufacturer a royalty fee of \$3 per ring?



Profit is maximized at point  $e$ , where  $Q_m$  units are sold at a price of  $P_m$  each.

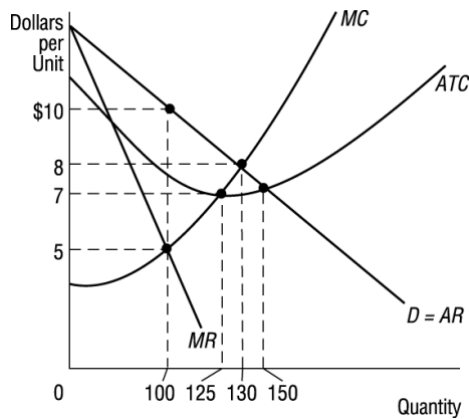
b. With a downward-sloping demand curve, additional units can be sold only by lowering the price on all units.

c. The deadweight loss is the area of triangle  $bce$ . If this was a competitive market, the industry would produce at point  $c$  since the LRAC is the industry's long-run supply curve in a constant-cost industry. Consumer surplus would equal the area of the triangle  $acf$ . With the monopoly, consumer surplus shrinks to the area of triangle  $abp_m$ , a loss of area  $p_m bcf$ . The portion  $p_m bef$  of the lost consumer surplus is redistributed to the monopolist as economic profit. Triangle  $bce$  is not redistributed—it is a deadweight loss.

d. This would shift the LRAC curve upward by \$3 and increase MC by \$3. Therefore, the new MC curve would intersect the MR curve at a lower output level, leading to a higher price.

14. (Short-Run Profit Maximization) Answer the following questions on the basis of the monopolist's situation illustrated in the following graph.

- a. At what output rate and price does the monopolist operate?
- b. In equilibrium, approximately what is the firm's total cost and total revenue?
- c. What is the firm's economic profit or loss in equilibrium?



- a. It will produce 100 units of output and sell them at a price of \$10 each
- b. Total cost of approximately \$750; total revenue of \$1,000
- c. Economic profit of approximately \$250

15. (Monopoly and the Allocation of Resources) What is the problem with monopoly? Compare monopoly to the benchmark of perfect competition established in the previous chapter. Use the exhibit below for reference.

When there is only one firm in a market, the price that firm charges determines the market quantity for its product. In order to maximize profit, the monopolist restricts its output; the quantity is determined by equating marginal revenue with marginal cost. At that quantity, the consumer's marginal benefit exceeds the monopolist's marginal cost. As one can see from Exhibit 8, as the quantity increases, the equilibrium price decreases, and the consumer's marginal benefit decreases. Though the consumer may still derive some benefit in a market controlled by a monopolist, market forces under perfect competition drive the equilibrium price down, and increase social welfare as a whole.

16. (Allocative and Distributive Effects) Why is society worse off under monopoly than under perfect competition, even if both market structures face the same constant long-run average cost curve?

Part of the reduction in consumer surplus under monopoly is considered a deadweight loss because it is a loss to consumers and no one reaps the benefits. A deadweight loss is a result of higher prices and reduced output. In a monopoly, price always exceeds marginal costs, so society would be worse off under a monopoly.

17. (Welfare Cost of Monopoly) Explain why the welfare loss of a monopoly may be smaller or larger than the loss shown in the exhibit above.



The loss may be smaller because a monopolist may have economies of scale that are not available to a perfectly competitive firm and, thus, can charge a lower price. A monopolist may charge a lower price to discourage entry of new firms or in response to political pressure. The loss may be larger because resources may be diverted from more productive uses to secure the monopolist's position (rent seeking). Lack of competition may eliminate pressure for the monopolist to maximize efficiency or to be innovative.

18. (Conditions for Price Discrimination) List three conditions that must be met for a monopolist to price discriminate successfully.

First, the firm must be a price maker—that is, it must have some control over its price. Second, it must be able to separate consumers into two or more groups with different elasticities of demand. Finally, the firm must be able to prevent the group facing the lower price from reselling the product to the group facing the higher price.

19. (Price Discrimination) Explain how it may be profitable for South Korean manufacturers to sell new autos at a lower price in the United States than in South Korea, even with transportation costs included.

This is a simple price discrimination problem. One need only assume that the demand elasticity in the United States is greater than in Korea. This assumption is reasonable if the U.S. market has more substitutes. Also, the long distance would prevent U.S. buyers from reselling in Korea. Price discrimination calls for a higher price in Korea, where the price elasticity of demand is lower. (By the way, it appears that autos are indeed sold at a higher price in Korea than in the United States.)

20. (Perfect Price Discrimination) Why is the perfectly discriminating monopolist's marginal revenue curve identical to the demand curve it faces?

The perfectly discriminating monopolist can charge a different price for each unit as output expands. By increasing output by one unit, the perfectly discriminating monopolist loses no revenue from previous output since the prices attached to previous units do not change. The gain in revenue is therefore just the price charged on the marginal unit.

21. (Short-Run Profit Maximization) A monopolistically competitive firm faces the following demand and cost structure in the short run:

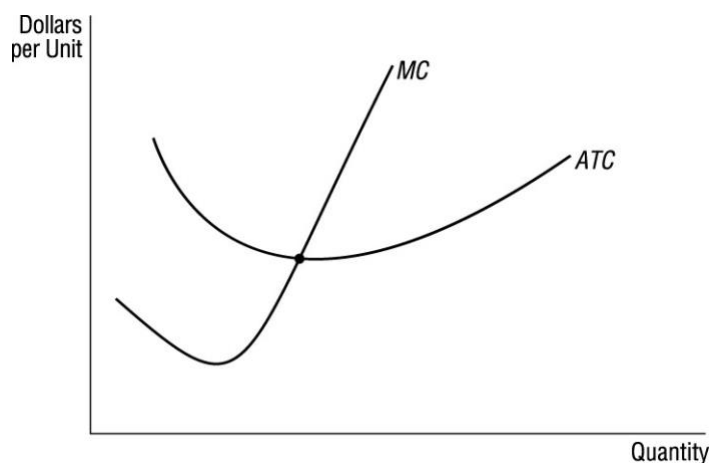
<u>Output</u>	<u>Price</u>	<u>FC</u>	<u>VC</u>	<u>TC</u>	<u>TR</u>	<u>Profit/Loss</u>
0	\$100	\$100	\$ 0	_____	_____	_____
1	90	_____	50	_____	_____	_____
2	80	_____	90	_____	_____	_____
3	70	_____	150	_____	_____	_____
4	60	_____	230	_____	_____	_____
5	50	_____	330	_____	_____	_____
6	40	_____	450	_____	_____	_____
7	30	_____	590	_____	_____	_____

- Complete the table.
- What is the highest profit or lowest loss available to this firm?
- Should this firm operate or shut down in the short run? Why?
- What is the relationship between marginal revenue and marginal cost as the firm increases output?

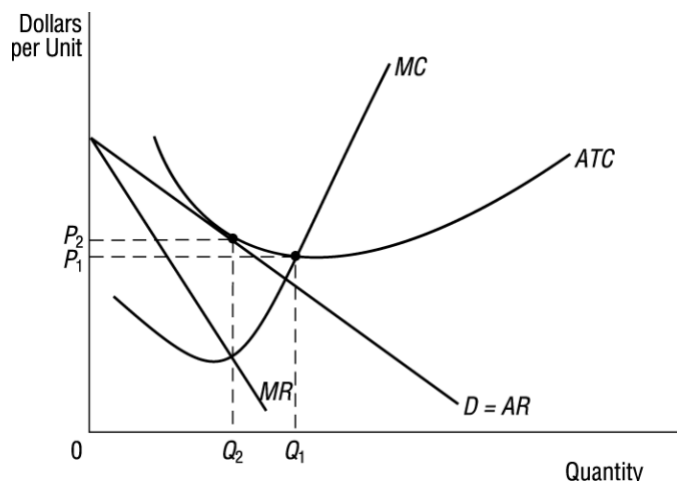
a.	<u>Output</u>	<u>Price</u>	<u>FC</u>	<u>VC</u>	<u>TC</u>	<u>TR</u>	<u>Profit/Loss</u>
	0	\$100	\$100	\$ 0	\$100	\$ 0	-\$100
	1	90	100	50	150	90	-60
	2	80	100	90	190	160	-30
	3	70	100	150	250	210	-40
	4	60	100	230	330	240	-90
	5	50	100	330	430	250	-180
	6	40	100	450	550	240	-310
	7	30	100	590	690	210	-480

- The lowest loss is \$30.
  - The firm should continue to produce up to and including 2 units because marginal revenue still exceeds marginal cost. [See answer to part (d).] In addition, at that quantity, price exceeds average variable cost. Operating in that range allows the firm to cover at least a portion of the fixed costs (\$100) that would not be covered at all if the firm shut down. Specifically, the firm should produce 2 units.
  - Through 2 units of output, marginal revenue exceeds marginal cost. Beyond 2 units, marginal cost exceeds marginal revenue.
22. (Monopolistic Competition and Perfect Competition Compared) Illustrated below are the marginal cost and average total cost curves for a small firm that is in long-run equilibrium.
- Locate the long-run equilibrium price and quantity if the firm is perfectly competitive.
  - Label the price and quantity  $p_1$  and  $q_1$ .
  - Draw in a demand and marginal revenue curve to illustrate long-run equilibrium if the firm is monopolistically competitive. Label the price and quantity  $p_2$  and  $q_2$ .
  - How do the monopolistically competitive firm's price and output compare to those of the perfectly competitive firm?

e. How do long-run profits compare for the two types of firms?



(a), (b), and (c)



(d) The monopolistically competitive firm's price is higher and its output is lower.

(e) Both types of firms earn zero long-run economic profits.

23. (Varieties of Oligopolies) Do the firms in an oligopoly act independently or interdependently? Explain your answer.

Firms in an oligopoly act interdependently. This means that the demand for one firm's output depends on the actions of its rival firms. This makes decision making difficult regarding price and output levels. Oligopolists try to reduce uncertainty about their demand by engaging in behavior that makes their rivals' actions more predictable (colluding, forming cartels, using price leadership) or by assuming certain actions by their rivals.

24. (Price Leadership) Why might a price-leadership model of oligopoly not be an effective means of collusion in an oligopoly?

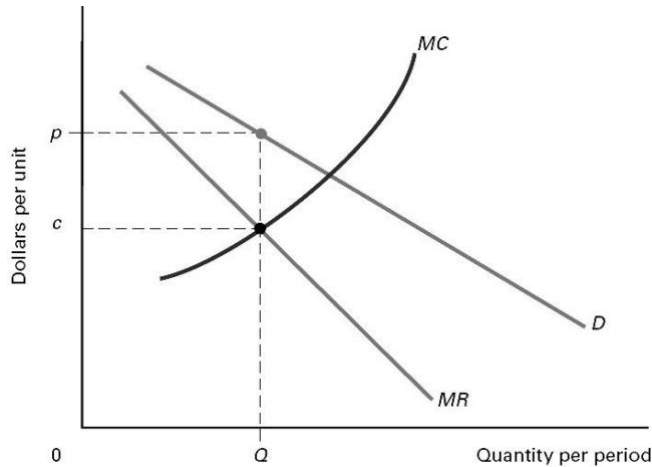
Price leadership is subject to a variety of obstacles. It violates antitrust law. The greater the product differentiation among sellers, the less effective price leadership becomes. There is no guarantee others will follow the price leader. Some firms may cheat on the price. A profitable price may attract new entrants unless there are barriers to entry.

25. (Collusion and Cartels) Why would each of the following induce some members of OPEC to cheat on their cartel agreement?

- a. Newly joined cartel members are less-developed countries.
  - b. The number of cartel members doubles from 11 to 22.
  - c. International debts of some members grow.
  - d. Expectations grow that some members will cheat.
- 
- a. Many of the OPEC countries are less developed and need oil revenues to help diversify their economies. If the underdevelopment or slow growth continues while the rest of the world continues to grow, there will be an incentive for such countries to boost production and attempt to improve their economies.
  - b. The larger the number of firms in the cartel, the more difficult it is to reach a consensus on the allocation of output among members. As the size of the cartel increases, motivation to cheat increases, and it becomes more difficult to track each member's output.
  - c. To pay their loans expeditiously, such countries may resort to increased production and sales, thus cheating on the quotas.
  - d. Each member expects that other members will cheat, and therefore cheats also.

26. (Collusion and Cartels) Use revenue and cost curves to illustrate and explain the sense in which a cartel behaves like a monopolist.

Suppose all firms in an industry formed a cartel. Given the market demand curve,  $D$ , the cartel must maximize its profit. Its first task is to determine its marginal cost of production. Because a cartel acts like a monopoly that runs many plants, the marginal cost curve for the cartel ( $MC$ ) is the horizontal sum of each firm's marginal cost curve. The cartel's marginal cost curve intersects the market's marginal revenue curve to determine output that maximizes the cartel's profit. This intersection yields quantity  $Q$ . The cartel's price,  $p$ , is read off the demand curve at that quantity.



27. (Game Theory) Suppose there are only two automobile companies, Ford and Chevrolet. Ford believes that Chevrolet will match any price it sets, but Chevrolet too is interested in maximizing profit. Use the following price and profit data to answer the following questions.

Ford's Selling Price	Chevrolet's Selling Price	Ford's Profits (millions)	Chevrolet's Profits (millions)
\$ 4,000	\$ 4,000	\$ 8	\$ 8
4,000	8,000	12	6
4,000	12,000	14	2
8,000	4,000	6	12
8,000	8,000	10	10
8,000	12,000	12	6
12,000	4,000	2	14
12,000	8,000	6	12
12,000	12,000	7	7

- What price will Ford charge?
- What price will Chevrolet charge once Ford has set its price?
- What is Ford's profit after Chevrolet's response?
- If the two firms collaborated to maximize joint profits, what prices would they set?
- Given your answer to part (d), how could undetected cheating on price cause the cheating firm's profit to rise?

- d. \$8,000. Under the matching assumption (If Ford and Chevrolet both charge \$4,000, the profits would be \$8; if they both charge \$8,000, the profits are \$10; and if they both charge \$12,000, the profits will be \$7), Ford's profits of \$10 million are higher than those for any other price.
  - e. If Ford charges \$8,000, Chevrolet maximizes its profits (\$12 million) by charging \$4,000.
  - f. If Chevrolet is charging \$4,000 and Ford is charging \$8,000, Ford's profit is \$6 million.
  - g. Both companies would set the price at \$8,000, making total profits of \$20 million that would be split equally between them. Any other price combination lowers joint profit.
  - h. Chevrolet could increase its profits to \$12 million by cutting its price to \$4,000 (if undetected). Ford could also increase profits to \$12 million by cutting its price to \$4,000 (if undetected).
28. (Game Theory) While grading a final exam, an economics professor discovers that two students have virtually identical answers. She is convinced the two cheated but cannot prove it. The professor speaks with each student separately and offers the following deal: Sign a statement admitting to cheating. If both students sign the statement, each will receive an -F- for the course. If only one signs, he is allowed to withdraw from the course while the other student is expelled. If neither signs, both receive a -C- since the professor does not have sufficient evidence to prove cheating.
- a. Draw the payoff matrix.
  - b. Which outcome do you expect? Why?

a. The payoff matrix is

	Student A signs	Student A does NOT sign
Student B signs	A gets an F; B gets an F	A is expelled; B withdraws
Student B does NOT sign	A withdraws; B is expelled	A gets a C; B gets a C

- b. While it would be best for both students if each refused to sign, the most likely outcome is that both students sign and receive an -F-. This is because failure to sign could lead to expulsion. Unless each student can somehow ensure the other will not sign, the threat of expulsion will most likely lead to each signing the statement.
29. (Market Structures) Determine whether each of the following is a characteristic of perfect competition, monopolistic competition, oligopoly, and/or monopoly:

- a. A large number of sellers
  - b. Product is a commodity
  - c. Advertising by firms
  - d. Barriers to entry
  - e. Firms that are price makers
- 
- a. Perfect competition and monopolistic competition
  - b. Perfect competition
  - c. Monopolistic competition and oligopolies with differentiated products; some monopolies
  - d. Oligopoly and monopoly
  - e. Monopolistic competition, oligopoly, and monopoly

#### PRICING STRATEGIES:-

Pricing decisions are equally important for a new product and an existing product, for entering into a new market or a new market segment and are affected by a host of factors like objective of the firm, cost of production, market structure, competitor's strategy, elasticity of demand, government policy, etc.

#### COST BASED PRICING:-

Under cost plus pricing, price of the product is the sum of cost plus a profit margin.

- i. Cost plus or Mark up pricing

Price= AC+ m, where AC=TC/Q, m is the percentage of mark up

- ii. Marginal cost pricing

This is used when demand is slack and market is highly competitive. Under marginal cost pricing price of the product is the sum of variable cost plus a profit margin. This method is used by firms to enter into a new market as well as to beat competitors. As this method ignores the element of fixed cost, it cannot be adopted as a long term strategy.

- iii. Target Return Pricing

This method of pricing is the same as the previous ones but for the fact that margin is decided on the basis of target rate of return, determined on the company's experience, consumer's paying capacity, risk involved, and similar other factors.

## PRICING BASED ON FIRM'S OBJECTIVES:-

If we consider pricing in the light of objectives of a firm, a profit maximizing firm considers total cost of production for determination of price and hence will adopt Mark up pricing. Those which maximize sales would adopt competitive pricing like Marginal cost pricing.

## COMPETITION BASED PRICING:-

### (A) PENETRATION PRICING

When a firm plans to enter a new market which is dominated by existing players, its only option is to charge a low price, even lower than the ongoing price. This price is called Penetration price. The principle of marginal costing may be used to determine penetration price. This method is short term in perspective and its success largely depends upon the price elasticity of demand of the product because in the long run ultimately factors other than price may become important.

### (B) ENTRY DETERRING PRICING

Under this method of pricing the price is kept low, thus making the market unattractive for other players. Success of entry deterring pricing strategy depends on the fact that the firm earns economies of scale and hence can afford to charge low price. This practice is also known as Limit Pricing.

### (C) GOING RATE PRICING

Going rate pricing strategy is adopted when most of the players do not indulge in separate pricing but follow the prevailing market price. This pricing strategy is popular in monopolistic and oligopoly markets where product differentiation is minimal or only cosmetic, and consumer's switching cost is almost negligible. It is mostly adopted when the product has reached maturity and has become generic to the extent that consumers ask for a good soap or soft tooth brush instead of a particular brand.

## PRODUCT LIFE CYCLE BASED PRICING:-

Product life cycle pricing refers to different pricing for a product at different stages of its life cycle (viz. introduction, growth, maturity, saturation, and decline).



**(A) PRICE SKIMMING:-**

Under price skimming producers charge a very high price in the beginning to skim the market and earn super margins on sales. As the market is small in the introduction stage, a firm tries to popularize its product among the niche consumers and may charge a high price and skim the market by creating high value perception on account of the novelty factor of the product. Nokia has been using this strategy successfully for its products.

**(B) PRODUCT BUNDLING:-**

Under product bundling two or more products are bundled together for a single price. This strategy is often used as a double edged weapon, for propagating a new product, as well as for selling a product in its stage of decline. It may be adopted at the time of introduction as well as during growth and maturity.

**(C) PERCEIVED VALUE PRICING:-**

According to this pricing, value of goods for different consumers depends upon their perception of utility of the good. The underlying philosophy of this pricing is that a product is as good as a consumer finds it. Such pricing is normally adopted during the growth and maturity stage so as to differentiate the product from that of competitors' and retain the quality conscious customers. Here the price of the good is not at all governed by the cost of production.

**CYCLICAL PRICING:-**

**(A) RIGID PRICING:-**

Rigid pricing suggests that firms should follow a stable pricing policy irrespective of the phase of the economic cycle (i.e. inflation and recession)

**(B) FLEXIBLE PRICING:-**

Under flexible pricing firms keep their prices flexible to meet the challenges of change in demand.

**MULTI PRODUCT PRICING:-**

**(A) LOSS LEADER PRICING:-**

Under loss leader pricing multi product firms sell one product at a low price and compensate the loss by other products.

**(B) TRANSFER PRICING:-**

Transfer prices are the charges made when a company supplies goods, services or financials to its subsidiary or sister concern. Transfer pricing is used in large organizations for transaction between various divisions, i.e., internal pricing as opposed to external market.

**RETAIL PRICING:-**

**(A) EVERY DAY LOW PRICING(EDLP):-**

Under EDLP a low price is charged throughout the year and none or very few special discounts are given on special occasions. This method can be successful only when the retailer is very large in size to avail of economies of scale and has very low overhead expenses.

**(B) HIGH-LOW PRICING:-**

This method involves high prices on a regular basis, coupled with temporary (or occasional) discounts as promotional activity. On all days the price is higher than EDLP, but on discount days it is lower than EDLP. This method is adopted by those firms which have high overhead expenses and cannot afford everyday low pricing.

**(C) VALUE PRICING:-**

Under value pricing sellers try to create a high value of the product and charge a low price. This is a strategy suitable for the maturity and saturation stage when demand can be maintained by keeping focus on higher quality and lower cost.