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**DR. BABASAHEB AMBEDKAR
OPEN UNIVERSITY**

**MBA01C102
Semester 1**

PRODUCTION | CURRENCY | BREAK-EVEN POINT | SCARCITY | FORECASTING | PROFIT AND LOSS | RISK AND UNCERTAINTY | DEMAND AND SUPPLY | GOODS AND SERVICES

MANAGERIAL ECONOMICS

Message for the Students

Dr. Babasaheb Ambedkar Open (University is the only state Open University, established by the Government of Gujarat by the Act No. 14 of 1994 passed by the Gujarat State Legislature; in the memory of the creator of Indian Constitution and Bharat Ratna Dr. Babasaheb Ambedkar. We Stand at the seventh position in terms of establishment of the Open Universities in the country. The University provides as many as 54 courses including various Certificate, Diploma, UG, PG as well as Doctoral to strengthen Higher Education across the state.



On the occasion of the birth anniversary of Babasaheb Ambedkar, the Gujarat government secured a quiet place with the latest convenience for University, and created a building with all the modern amenities named 'Jyotirmay' Parisar. The Board of Management of the University has greatly contributed to the making of the University and will continue to this by all the means.

Education is the perceived capital investment. Education can contribute more to improving the quality of the people. Here I remember the educational philosophy laid down by Shri Swami Vivekananda:

“We want the education by which the character is formed, strength of mind is Increased, the intellect is expand and by which one can stand on one’s own feet”.

In order to provide students with qualitative, skill and life oriented education at their threshold. Dr. Babaasaheb Ambedkar Open University is dedicated to this very manifestation of education. The university is incessantly working to provide higher education to the wider mass across the state of Gujarat and prepare them to face day to day challenges and lead their lives with all the capacity for the upliftment of the society in general and the nation in particular.

The university following the core motto ‘स्वाध्यायः परमम् तपः’ does believe in offering enriched curriculum to the student. The university has come up with lucid material for the better understanding of the students in their concerned subject. With this, the university has widened scope for those students who

are not able to continue with their education in regular/conventional mode. In every subject a dedicated term for Self Learning Material comprising of Programme advisory committee members, content writers and content and language reviewers has been formed to cater the needs of the students.

Matching with the pace of the digital world, the university has its own digital platform Omkar-e to provide education through ICT. Very soon, the University going to offer new online Certificate and Diploma programme on various subjects like Yoga, Naturopathy, and Indian Classical Dance etc. would be available as elective also.

With all these efforts, Dr. Babasaheb Ambedkar Open University is in the process of being core centre of Knowledge and Education and we invite you to join hands to this pious *Yajna* and bring the dreams of Dr. Babasaheb Ambedkar of Harmonious Society come true.



Prof. Ami Upadhyay
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MBA
SEMESTER-1
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BLOCK: 1

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Dr. Babasaheb Ambedkar Open University
(Established by Government of Gujarat)

MANAGERIAL ECONOMICS

SEMESTER-1

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1.0 INTRODUCTION**1.1 DEFINITIONS OF MANAGERIAL ECONOMICS****1.2 SCOPE OF MANAGERIAL ECONOMICS****1.2.1 NATURE OF MANAGERIAL ECONOMICS****1.3 ROLE OF MANAGERIAL ECONOMICS****1.4 CHIEF CHARACTERISTICS OF MANAGERIAL ECONOMICS****1.5 SIGNIFICANCE OF MANAGERIAL ECONOMICS****1.6 FUNDAMENTALS CONCEPTS IN MANAGERIAL ECONOMICS****1.6.1 THE OPPORTUNITY COST CONCEPT:****1.6.2 EQUI-MARGINAL CONCEPT:****1.6.3 DISCOUNTING CONCEPT:****1.7 ROLE AND RESPONSIBILITY OF A MANAGERIAL ECONOMIST:****1.8 RESPONSIBILITIES OF A MANAGERIAL ECONOMIST IN BUSINESS****❖ CHECK YOUR PROGRESS**

1.0 INTRODUCTION

Economics is the study of the production, distribution, and consumption of goods and services. Also, it is the study of choice related to the allocation of scarce resources.

Managerial economics is defined as the branch of economics. Managerial Economics refers to the firm's decision-making process. The purpose of managerial economics is to provide economic terminology and reasoning for the improvement of managerial decisions.

It could also be interpreted as “Economics of Management” or “Industrial economics” or “Business economics”. Therefore, the understanding of managerial economics is essential. According to **Spencer and Siegelman**: “It is the integration of economic theory with business practice for the purpose of facilitating decision making and forward planning by management.”

- It means management of limited funds available in the most economical way. It deals with basic problems of the economy i.e.
- What
- How
- For Whom to Produce.

Introduction of Managerial Economics

Managerial economics is a management science that gives you more idea about the economic aspects of a market and how they affect your decision-making. This is very important because economic profits play a pivotal role in a market-based economy. While above-normal profits are indicators of expansion and growth, below-normal profits caution you about tightening or retrenchment. Business economics is comprised of several tools of micro and macroeconomic analysis which are useful in management decision-making that acts as facilitators to solve business problems.

1.1 DEFINITIONS OF MANAGERIAL ECONOMICS

Several economists have given various definitions of managerial economics.

- **In the words of Joel Dean**, “The purpose of managerial economics is to show how economic analysis can be used in formulating business policies”.
- **According to McNair and Meriam**, “Managerial economics deals with the use of economic modes of thought to analyze business situation”.
- **According to Henry and Hayne**: “Managerial economics is economics applied in decision making. It is a special branch of economics. That bridges the gap between abstract theory and managerial practice.”
- **In the word of Salvatore**, “Managerial economics refers to the application of economic theory and the tools of analysis of decision science to examine how an organization can achieve its objectives most effectively.”
- **Brigham and Poppas** believe that managerial economics is "the application of economic theory and methodology to business administration practice."
- **Davis and Chang** say:
- "Managerial economics applies the principles and methods of economics. By applying the concept, the branch of economics analyzes problems faced by the management of a business, or other types of organizations and to help find solutions that advance the best interests of such organizations.”
- In the most accepted definition, **Prof. Evan J. Douglas** defines it thus: “Managerial economics is concerned with the application of economic principles and methodologies to the decision-making process within the firm or organization under the conditions of uncertainty.”

The study of economic phenomena at micro level i.e. individual and firm-level. check Microeconomics is the study of how individual firms or consumers do and/or should make economic decisions taking constraints into account . Since the purpose of managerial economics is to apply economics for the improvement of managerial decisions in an organization , most of the subject material in managerial economics has a microeconomic focus. However , since managers must consider the state of their environment in making decisions and the environment includes the overall economy, an understanding of how to interpret and forecast macroeconomic measures is useful in making managerial decisions. Micro economic instruments used in this context include demand analysis, production and cost analysis , breakeven analysis , theory of pricing , technical progress , location decisions, and capital budgeting.

1.2 SCOPE OF MANAGERIAL ECONOMICS

Managerial economics refers to its area of study. Managerial economics provides management with a strategic planning tool that can be used to get a clear perspective of the way the business

World works and what can be done to maintain profitability in an ever-changing economic environment of the world. Managerial economics is primarily concerned with the application of economic principles and theories to five types of resource decisions made by all types of business organizations.

- a. The selection of product or service to be produced.
- b. The choice of production methods and resource combinations.
- c. The determination of the best price and quantity combination
- d. Promotional strategy and activities.
- e. The selection of the location from which to produce and sell goods or services to the consumer.

1) Demand Analysis and Forecasting:

A major part of managerial decision-making depends on accurate estimates of demand. By forecasting future sales manager prepares production schedules and employs resources which helps management to strengthen its market position as well as profit.

2) Cost and production Analysis:

A manager prepares cost estimates of a range of output and chooses the optimum level of output at which cost is minimized. The manager is supposed to carry out the production function analysis to avoid wastage of materials and time.

3) Pricing Decisions:

The success of a business firm depends upon correct pricing policy decisions taken by it. Different pricing method is used for different market structure, price to a great extent determines the revenue of the firm.

4) Profit Management:

Business firms aim to earn profits in long run and profits are a reward for uncertainty and risk-bearing in the business organization. A manager should be able to take a calculated risk and try to avoid uncertainty for higher profits.

5) Capital Management:

Managerial economics also helps in the appropriate planning and controlling of capital expenditure since it involves a huge amount of money as well as time.

Introduction of Managerial Economics

1.2.1 Nature of Managerial Economics

- **ALLOCATION OF RESOURCES:** Since resources are scarce and they have multiple uses, Managerial Economics focuses on optimum allocation of funds available, which also reduces the wastage level.
- **MICROECONOMIC NATURE:** Managerial Economics is microeconomic in character. It deals with business firms. A firm is the smallest decision-making unit of production. Since the study is about firm, the problems faced by the firms also falls under the purview of microeconomics.
- **MARKET KNOWLEDGE:** A firm is open to threats as well as opportunities in the marketplace. So knowledge of the market must be perfect.
- **MACRO-SETTING:** A firm has to operate within a given economy. So it's also governed and affected by the trends in income, consumption, investment, savings levels in an economy.
- **Positive and Normative Approach:** Positive approach is concerned with what is, was, or will be, while the normative approach is concerned with what ought to be.

Positive economics is of two types: Economics description shows the state of operation of the firm at a point in time whereas an economic theory explains why it happened.

1.3 ROLE OF MANAGERIAL ECONOMICS

A managerial economist helps the management by using his analytical skills and highly developed techniques in solving complex issues of successful decision-making and future advanced planning.

❖ **The role of managerial economist can be summarized as follows:**

- **Studies Business Environment:**

Managerial economics properly analyzes the external environment within which the business operates. These factors influence the working of the business and therefore should be considered while taking any decisions and framing policies. Managerial economic studies all factors like economic scenario, government policies, price trends, national income growth, etc.

- **Production Scheduling:**

Managerial economics manages and prepares schedules for all production activities of the business. It estimates all future demands using various quantitative tools which helps in making production plans.

- **Control Cost:**

Controlling the cost is vital for achieving the desired profitability and growth. Managerial economics estimates the cost of all business activities and identifies all those factors that cause variations in cost from time to time. It aims at minimizing the cost through optimum utilization of all available resources.

- **Set Prices:** Setting the right price is a very challenging task for every business organization. Managerial economics helps management in fixing the correct price by supplying all information regarding competitor's pricing methods.
- **Bring Coordination:** Managerial economics brings coordination and flexibility in all operations of the business. It supports effective decision-making by providing all relevant data using economic theories and tools.
- **Investment Analysis:** Managerial economics ensures that all business funds are allocated to profitable means. It properly analyzes the profitability of all investment avenues before investing any amount into it.
- **Specific Decisions:** There are several specific decisions that managers might have to take alike: Production scheduling, demand forecasting, market research, security management analysis, economic analysis of the industry, advice on trade, pricing decisions.
- **General Tasks:** It includes understanding external factors and suggesting to the firm which policy is to be used. External factors include- economic condition of the economy, demand for the product, market conditions of raw materials, input cost of the firm affected by outside forces.

1.4 CHIEF CHARACTERISTICS OF MANAGERIAL ECONOMICS

- (i) Managerial economics deals with the problems and principles of an individual business firm or an individual industry. It aids in management. Management utilizes managerial elements in forecasting and evaluating the trends of the market.
- (ii) It also discusses various aspects of corrective measures that management undertakes under various circumstances. It discusses goal determination, goal development, and realization of these goals. Future planning, policymaking, decision-making, and optimal utilization of available resources fall under the umbrella banner of managerial economics.
- (iii) Managerial economics is practical. According to pure microeconomic theory, analysis is contingent on certain exceptions, which are far from reality. However, in managerial economics, managerial issues are resolved daily. But, difficult issues of economic theory are kept at bay.
- (iv) It provides a platform for economic concepts and principles, which are known as the theory of Firm or "Economics of the Firm". Thus, the economics' scope is narrower than that of pure economic theory.
- (v) Managerial economics involves certain aspects of macroeconomic theory. They are essential in dealing with the circumstances and environments that feature the working conditions of an individual firm or an industry.
- (vi) Managerial economics functions for supporting the management in taking counteractive decisions and charting plans and policies for the future.
- (vii) The subject is an applied discipline. It concerns the application of economic principles concerning policy formulation, decision-making, and future planning. It is not only concerned with the goals of an organization but also is prescribed with the means of achieving these goals.

1.5 SIGNIFICANCE OF MANAGERIAL ECONOMICS

Management is concerned with decision-making. Decision-making needs a balance between simplification of analysis to be manageable and complications for handling a variety of factors and objectives. Managerial economics accomplished several objectives. Moreover, it also needs common sense and good judgment. Managerial economics helps the decision-making process in the following ways:

1. It helps in decision making
2. Decision-making means a balance between simplification of analysis to be manageable and complication of factors in hand.
3. Managerial economics also incorporates useful ideas from other disciplines such as psychology, sociology, etc.; if they are found relevant for decision-making.
4. Managerial economics takes the aid of other academic disciplines having a bearing on the business decisions of a manager because of the various explicit and implicit constraints subject to which resource allocation is to be optimized.
5. Managerial economics helps a manager to be a more competent model builder. Thus, he can capture the essential relationship, which characterizes a situation while leaving out the cluttering details and peripheral relationships.
6. It helps in providing most of the concepts that are needed for the analysis of business problems, the concepts such as elasticity of demand, fixed cost, variable cost, Short Run and Long Run costs, opportunity costs, NPV, etc.,
7. At the level of the firm, where various functional areas, functional specialists or functional departments exist, such as finance, marketing, personal, production, etc. Managerial economics serves as an integrating agent by coordinating the different areas and bringing to bear on the decisions of each department or specialist the implications about other functional areas.
8. Managerial economics helps in reaching a variety of business decisions in a complicated environment such as what products and services should be produced? It helps in making decisions in the following. What should be the product mix? Which is the production technique? What should be the level of output and price? How to take investment decisions? How much should the firm advertise?
9. Managerial economics takes cognizance of the interaction between the firm and society and accomplishes the key role of business as an agent in the attainment of social and economic welfare. It has come to be raised that a business, apart from its obligations to shareholders, has certain social obligations.
10. Managerial economics focuses attention on those social obligations as constraints subject to which business decisions are to be taken. It serves as an instrument in furthering the economic welfare of society through socially-oriented business decisions.

1.6 FUNDAMENTALS CONCEPTS IN MANAGERIAL ECONOMICS

Managerial Economics is both conceptual and metrical. Before the substantive decision problems which fall within the purview of managerial economics are

discussed, it is useful to identify and understand some of the basic concepts underlying the subject.

Economic theory provides several concepts and analytical tools which can be of considerable and immense help to a manager in taking many decisions and business planning. This is not to say that economics has all the solutions. Actual problem-solving in business has found that there exists a wide disparity between the economic theory of the firm and actual observed practice.

Therefore, it would be useful to examine the basic tools of managerial economics and the nature and extent of the gap between the economic theory of the firm and the managerial theory of the firm. The contribution of economics to managerial economics lies in certain principles which are basic to managerial economics. There are some basic principles of managerial economics. They are:

1.6.1 The Opportunity Cost Concept

Both micro and macroeconomics make abundant use of the fundamental concept of opportunity cost. In everyday life, we apply the notion of opportunity cost even if we are unable to articulate its significance. In Managerial Economics, the opportunity cost concept is useful in a decision involving a choice between different alternative courses of action.

Resources are scarce, we cannot produce all the commodities. For the production of one commodity, we have to forego the production of another commodity. We cannot have everything we want. We are, therefore, forced to make a choice.

The opportunity cost of a decision is the sacrifice of alternatives required by that decision. The sacrifice of alternatives is involved when carrying out a decision requires using a resource that is limited in supply with the firm. Opportunity cost, therefore, represents the benefits or revenue foregone by pursuing one course of action rather than another.

The concept of opportunity cost implies three things:

1. The calculation of opportunity cost involves the measurement of sacrifices.
2. Sacrifices may be monetary or real.
3. The opportunity cost is termed as the cost of sacrificed alternatives.

Opportunity cost is just a notional idea that does not appear in the books of account of the company. If the resource has no alternative use, then its opportunity cost is nil.

In managerial decision-making, the concept of opportunity cost occupies an important place. The economic significance of opportunity cost is as follows:

1. It helps in determining the relative prices of different goods.
2. It helps in determining normal remuneration to a factor of production.
3. It helps in the proper allocation of factor resources.

The opportunity costs or alternative costs are the return from the second-best use of

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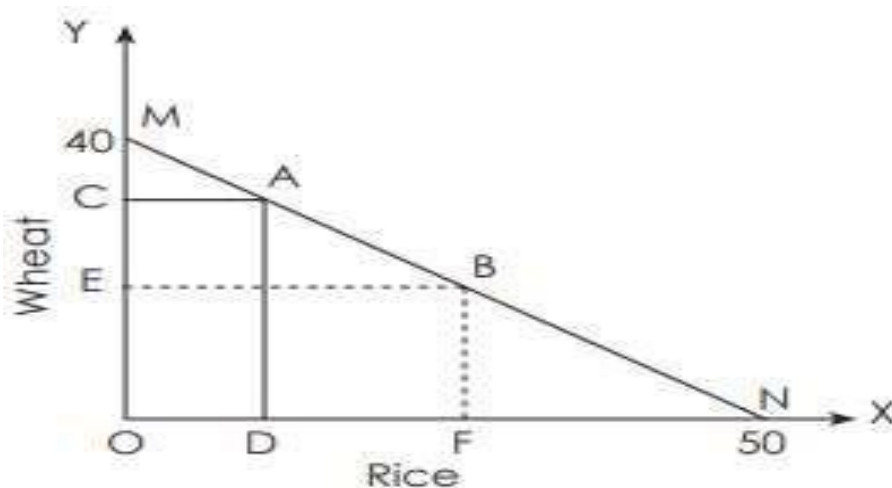
the firm's resources which the firm forgoes to avail itself of the return from the best use of the resources. The concept of opportunity cost can best understand with the help of illustrations, which are as follows:

- The funds employed in one's own business are equal to the interest that could earn on those funds if the employee in other ventures.
- The time an entrepreneur devotes to his own business is equal to the salary he could earn by seeking employment.
- Using a machine to produce one product is equal to the earnings forgone which would have been possible from other products.
- Using a machine that is useless for any other purpose is zero since its use requires no sacrifice of other opportunities.

How to Calculate Opportunity Cost

The formula of Opportunity cost = Return of Investment from the best option available – Return of investment from the chosen option.

Opportunity Cost Graph –



Let's assume that the farmer can produce either 50 quintals of rice (ON) or 40 quintals of wheat (OM) using this land. Now, if he produces rice, then he cannot produce wheat.

Therefore, the OC of 50 quintals of rice (ON) is 40 quintals of wheat (OM).

Further, the farmer can choose to produce any combination of the two crops along the curve MN (production possibility curve). Let's say that he chooses to point A as shown above.

Therefore, he produces OD amount of rice and OC amount of wheat. Subsequently, he decides to shift to point B. Now, he has to reduce the production of wheat from OC to OE to increase the production of rice from OD to OF.

Therefore, the OC of DF amount of rice is CE amount of wheat.

- **Applications of Opportunity Cost**
- Determining factor prices
- Determining economic rent
- Consumption pattern decisions
- Determining factor prices
- Product plan decisions
- Decisions about national priorities

Determining factor prices

The factors for production need a price equal to or greater than what they command for alternative uses. If the factor price is less than the factor's opportunity cost, then the said factor moves to the better-paying alternative.

Determining economic rent

Many modern economists use this concept for determining economic rent. As per them, economic rent = The factor's actual earning – Its opportunity cost or transfer earning.

Consumption pattern decisions

According to this concept, if with a given amount of money a consumer chooses to have more of one thing, then he needs to have less of the other.

Further, he cannot increase the consumption of all the goods at the same time. Therefore, he decides his consumption pattern using the concept of opportunity cost.

Product plan decisions

Let's say that a producer has fixed resources and technology. If he wants to produce a greater amount of one commodity, then he must sacrifice the quantity of another commodity. Therefore, he uses this concept to make decisions about his production plan.

Decisions about national priorities

Every country has certain resources at its command and needs to plan the production of a wide range of commodities. This decision depends on the national priorities which are based on opportunity costs.

For example, if a country is at war, then it will use its resources to produce more war-related goods as compared to civilian goods.

- **Types of Opportunity Cost in Production**
- Explicit Cost
- Implicit Cost
- Marginal Opportunity Cost

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➤ What is Explicit Cost?

Explicit costs are the cost which includes the monetary payment from the producers. Wages, utility expenses, payment for raw materials, interest paid to the holders of the firm's bonds, and rent on a building are all examples of explicit expenses. For example, if the company is paying \$1000 per month in food by providing free lunch and breakfast, then its explicit OC is \$1000. The expenditure on food could have been used somewhere else.

➤ What is Implicit Cost?

Implicit cost aka notional cost can be defined as the OC which a company used to produce something. The implicit costs associated with any decision are much more difficult to compute. These costs do not involve cash expenditures and are therefore often overlooked in decision analysis. Because cash payments are not made for implicit costs, the opportunity cost concept must be used to measure them. The rent that a shop owner could receive on buildings and equipment if they were not used in the business is an implicit cost of the owner's retailing activity, as is the salary that an individual could receive by working for someone else instead of operating his or her own establishment. For example, a company purchased small electronic devices to produce mobile phones, laptops, etc. This cost is used to produce something, the electronic devices are not sold or rented.

On the contrary, implicit (or imputed) costs are those sacrifices (such as the interest on the owner's own investment) that are not reflected in accounts. Some writers equate O.C.s with implicit costs. The truth is that O.C.s cover all sacrifices, implicit or explicit.

➤ What is Marginal Opportunity Cost?

Marginal opportunity cost is a cost required to produce something extra. For example, currently, a company is producing 1000 burgers per day, but due to heavy demand, they are running out of burgers. So, the company decided to hire more people and cook more burgers.

Now marginal opportunity cost will include – payment of new employees, cost required for ingredients required to cook more burgers, profit company was missing before and many other extra costs required for producing additional burgers.

The cost involved in any decision is the sacrifices of alternatives required by that decision. In case there is no sacrifice, there is no cost either.

Large firms often make use of the opportunity cost concept. They use linear programming models, replacement models, and other optimization techniques. These are all based on the opportunity cost concept.

1.6.2 Equi-Marginal Concept

One of the widest known principles of economics is the equi-marginal principle. The

principle states that input should be allocated so that value added by the last unit is the same in all cases. This generalization is popularly called the equi-marginal. The cornerstone of the economists' marginal analysis is that purchases, activities, or productive resources should be allocated to ensure that the marginal utilities, benefits, or value-added accruing from each, are identical in all uses. Optimality requires that it should not be possible to increase the total benefit or reduce the total cost by moving one unit from one application to another.

If this Equi marginal condition is violated, the system is operating below its optimum and it is possible to gain some improvement by reallocation of inputs or purchases. The key assumption underlying this result is the law of diminishing returns or variable proportions. For the Equi marginal principle to operate, the law of diminishing returns is held to apply.

The law implies that the marginal product will decline as more of one resource is combined with fixed amounts of another. This proposition holds well over a wide range of economic activity. For example, successive applications of fertilizer tend to raise cereal yields per acre, but increasing quantities of fertilizer are successively required to give equal output increases.

The microeconomic theory of the demand for labour asserts that the profit-maximizing entrepreneur will continue to employ labor so long as the resulting addition to his costs is covered by the addition to his receipts from the sale of his products.

One of the fundamental principles of economics is the proposition that in input such as labour it should be so allocated among different activities or lines of production that the value added by the last unit is the same in all uses. This generalization is known as the equimarginal principle.

Let us assume a case in which the firm has 100 units of labor at its disposal. And the firm is involved in five activities viz., A, B, C, D, and E. The firm can increase any one of these activities by employing more labor but only at the cost i.e., the sacrifice of other activities.

An optimum allocation cannot be achieved if the value of the marginal product is greater in one activity than in another. It would be, therefore, profitable to shift labor from low marginal value activity to high marginal value activity, thus increasing the total value of all products taken together.

If, for example, the value of the marginal product of labor in activity A is Rs. 50 while that in activity B is Rs. 70 then it is possible and profitable to shift labor from activity A to activity B. The optimum is reached when the values of the marginal product are equal to all activities. This can be expressed symbolically as follows:

$$VMP_{LA} = VMP_{LB} = VMP_{LC} = VMP_{LD} = VMP_{LE}$$

Where VMP = Value of
Marginal Product. L = Labour

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ABCDE = Activities i.e., the value of the marginal product of labor employed in A is equal to the value of the marginal product of the labor employed in B and so on. The equi-marginal principle is an extremely practical notion.

The principle is also applied in investment decisions and allocation of research expenditures. For a consumer, this concept implies that money may be allocated over various commodities in such a way that marginal utility derived from the use of each commodity is the same. Similarly, for a producer, this concept implies that resources be allocated in such a manner that the marginal product of the inputs is the same in all uses.

1.6.3. Discounting Concept:

This concept is an extension of the concept of time perspective. Since the future is unknown and incalculable, there is a lot of risk and uncertainty in the future. Everyone knows that a rupee today is worth more than a rupee will be two years from now. This appears similar to the saying that "a bird in hand is more worth than two in the bush." This judgment is made not on account of the uncertainty surrounding the future or the risk of inflation.

It is simply that in the intervening period a sum of money can earn a return which is ruled out if the same sum is available only at the end of the period. In technical parlance, it is said that the present value of one rupee available at the end of two years is the present value of one rupee available today. The mathematical technique for adjusting for the time value of money and computing present value is called „discounting. The concept of discounting is found most useful in managerial economics in decision problems about investment planning or capital budgeting.

The formula of computing the present value is given below:

$$\begin{aligned} V &= A/1+I \text{ where:} \\ V &= \text{Present value} \\ A &= \text{Amount invested Rs. } 100 \text{ } i = \text{Rate of interest } 5 \text{ per cent} \\ V &= 100/1+.05 = 100/1.05 = \text{Rs. } 95.24 \end{aligned}$$

These formulas are usually to be made use of in any discussion of investment decisions and capital budgeting.

The essence of the principle, the discounting principle may now be summed up in the following words: If a decision affects both costs and revenues at future dates, it is essential to discount those cost and revenue to make them comparable to some present value before a valid comparison of alternatives is possible.

We often find the application of the principle in the business world. Suppose one borrows Rs. 10,000 from a bank on a note. If the note is for Rs. 10,000, the borrower will not get the full value but rather the amount discounted at the appropriate rate of interest.

If the discounting rate is 6% and if the note is for one year, the borrower will receive approximately Rs. 9,420. In this case, we can say that the present value to the bank of the borrower's promise to pay Rs. 1,000 in a year is only Rs. 942 at the time of the loan.

The principle operates in the bond market as well. The market price of a bond reflects not only its face value at maturity and interest payments but also the current discount rate. As the market discount rates vary, bond prices, vary inversely. Suppose you receive a bond that promises to pay you Rs. 10 per annum, in perpetuity.

If the market rate of interest (the discount rate here) is 10% its present value will be Rs. $10/10\% = \text{Rs. } 100$. If the rate of interest goes down to 5% its market price will rise to Rs. $10/5\% = \text{Rs. } 200$. So it is possible to make a capital gain of Rs. 100 by selling the bond.

The same principle can be applied in the case of an individual firm. Suppose a firm is considering buying a new machine. It should estimate the discounted value of the added (net) earnings from that machine before venturing out.

The same principles apply if the firm is considering the acquisition (purchase) of another firm or a merger. Likewise, a firm that produces output maturing at varying ages cannot compare the profitability of changing the product mix without invoking the discounting principle.

1.7 ROLE AND RESPONSIBILITY OF A MANAGERIAL ECONOMIST:

With the advent of the managerial revolution and transition from the owner-manager to the professional executive, managerial economists have occupied an important place in modern business. In real practice, firms do not behave in a deterministic world.

They strive to attain a multiplicity of objectives. Economic theory makes a fundamental assumption of maximizing profits as the basic objective of every firm. The application of pure economic theory seldom leads us to direct executive decisions.

Present business problems are either too obvious in their solution or purely speculative and they need a special form of insight. A managerial economist with his sound knowledge of theory and analytical tools can find out the solution to business problems. In advanced countries, big firms employ managerial economists to assist the management.

Organisationally, a managerial economist is placed nearer to the policymaker simply because his main role is to improve the quality of policymaking as it affects short-term operation and long-range planning. He has a significant role to play in assisting the management of a firm in decision-making and planning by using specialized skills and techniques.

Introduction of Managerial Economics

The factors which influence the business over a period may lie within the firm or outside the firm.

These factors can be divided into two categories:

- (i) External and
- (ii) Internal.

The external factors lie outside the control of the firm and these factors constitute the 'Business Environment'. The internal factors lie within the scope and operation of a firm and they are known as 'Business Operations'.

1. External Factors:

The prime duty of a managerial economist is to make an extensive study of the business environment and external factors affecting the firm's interest, viz., the level and growth of national income, the influence of the global economy on the domestic economy, trade cycle, volume of trade and nature of financial markets, etc. They are of great significance since every business firm is affected by them.

These factors have to be thoroughly analyzed by the managerial economist and answers to the following questions have also to be found out:

- (i) What are the current trends in the local, regional, national, and international economies? What phase of the trade cycle is going to occur in the near future?
- (ii) What about the change in the size of the population and the resultant change in regional purchasing power?
- (iii) Is competition likely to increase or decrease with reference to the products produced by the firm?
- (iv) Are fashions, tastes, and preferences undergoing any change, and have they affected the demand for the product?
- (v) What about the availability of credit in the money and capital markets?
- (vi) Is there any change in the credit policy of the government?
- (vii) What are the strategies of the five-year plan? Is there any special emphasis on industrial promotion?
- (viii) What will be the outlook of the government regarding its commercial and economic policies?
- (ix) Will the international market expand or contract and what are the provisions given by the trade organizations?
- (x) What are the regulatory and promotional policies of the central bank of a country?

Answer to these and similar questions will throw more light on the perspective of business and these questions present some of the areas where a managerial economist can make effective contributions through scientific decision making. He infuses objectivity, broad perspective, and thought of alternatives into the decision-making process.

His focus on long-term trends helps maximize profits and ensures the ultimate

success of the firm. The role of the managerial economist is not to take decisions but to analyze, conclude and recommend. His basic role is to provide a quantitative base for decision-making. He should concentrate on the economic aspects of problems. He should have a rare intuitive ability of perception.

2. Internal Factors:

The managerial economist can help the management in deciding on the internal operations of a firm in respect of such problems as cost structure, forecasting of demand, price, investment, etc.

Some of the important relevant questions in this connection are as follows:

- (i) What should be the production schedule for the coming year?
- (ii) What should be the profit budget for the coming year?
- (iii) What type of technology should be adopted in the specific process and specify it?
- (iv) What strategies have to be adopted for sales promotion, inventory control, and utilization of manpower?
- (v) What are the factors influencing the input cost?
- (vi) How different input components can be combined to minimize the cost of production?

Apart from the above studies, the managerial economist has to perform certain specific functions. He helps to coordinate practices relating to production, investment, price, sales, and inventory schedules of the firm. Forecasting is the fundamental activity that consumes most of the time of the managerial economist.

The sales forecast acts as a link between the external uncontrollable factors and the internal controllable factors and is intimately related to general economic activity. The managerial economist is usually assigned the task of preparing short-term general economic and specific market forecasts to provide a framework for the development of sales and profit. He has to help the firm to plan product improvement, new product policy, and pricing and sales promotion strategy.

The managerial economist often needs focused studies of specific problems and opportunities. He should indulge in a market survey, a product preference test, an advertising effectiveness study, and marketing research. Marketing research is undertaken to understand a marketing problem better.

The managerial economist has to undertake an economic analysis of competing firms. He should also undertake investment appraisal, project evaluation, and feasibility study. The managerial economist has to provide the necessary intelligence.

To conclude, a managerial economist has a very important role to play. He should be held in the confidence of the management. A managerial economist can serve the management best only if he always keeps in mind the main objective of his firm, which is to make a profit.

1.8. RESPONSIBILITIES OF A MANAGERIAL ECONOMIST IN BUSINESS:

We have analyzed the nature, scope, and methods of managerial economics. We shall now proceed to discuss the last part of our investigation the responsibilities of a managerial economist. As mentioned above, the managerial economist has an important role to play.

The managerial economist can play a very important role by assisting management in using the increasingly specialized skills and sophisticated techniques which are required to solve the different problems of successful decision making and planning. The functions of a managerial economist can be broadly defined as the study and interpretation of economic data in the light of the problems of the management. The managerial economist should be in a position to spare more time and thought on problems of an economic nature than the firm's administration. His job may involve a number of routine duties closely tied in with the firm's day to day activities.

The managerial economist is employed primarily as a general adviser. The advisory service refers to the opportunities open to the managerial economist because of the growing role of government in business life. He is responsible for the working of the whole business concern.

The most important obligation of a managerial economist is that his objective must coincide with that of the business. Traditionally, the basic objective of business has been defined in terms of profit maximization.

As a managerial economist, he must do something more than routine management to earn profit. He cannot expect to succeed in serving management unless he has a strong conviction which helps him in enhancing the ability of the firm.

The other most important responsibility of a managerial economist is to try to make as accurate a forecast as possible. The managerial economist has to forecast not only the various components of the external business picture, but he has also to forecast the various phases of the company's activity, that is the internal picture of the company.

The managerial economist should recognize his responsibilities to make a successful forecast. By making the best possible forecasts, the management can follow a more closely course of business planning. Yet another responsibility of the managerial economist is to bring about a synthesis of policies pertaining to production, investment, inventories, price, and cost. Production is an organized activity of transforming inputs into output.

The process of production adds to the value of the creation of utilities. The money expenses incurred in the process of production constitute the cost of production. Cost of production provides the floor, to pricing. It provides a basis for managerial decisions.

There are several areas that have attracted the attention of the managerial economist, such as maximizing profit, reducing stocks, forecasting sales, etc. If the inventory

level is very low, it hampers production. A managerial economist's first responsibility, therefore, is to reduce his stocks, for a great deal of capital is unprofitably tied up in the inventory.

The managerial economist's contribution will be adequate only when he is a member of full status in the business team. The managerial economist should make use of his experience and facts in deciding the nature of the action.

He should be ready to undertake special assignments with full seriousness. The managerial economist can put even the most sophisticated ideas in simple language and avoid hard technical terms. It is also the managerial economist's responsibility to alert the management at the earliest possible moment in case he discovers an error in his forecast. In this way, he can assist the management in adopting appropriate adjustments in various policies and programs.

He must be alert to new developments both economic and political in order to appraise their possible effects on business. The managerial economist should establish and maintain many contacts and data sources that would not be immediately available to the other members of management. For this purpose, he should join professional, trade associations, and take an active part in them.

To conclude, a managerial economist should enlarge the area of certainty. To discharge his role successfully, he must recognize his responsibilities and obligations. No one can deny that the managerial economist contributes significantly to the profitable growth of the firm through his realistic attitude.

❖ CHECK YOUR PROGRESS

1. LONG QUESTIONS

- 1) What is managerial economics? Explain various definitions of managerial economics.
- 2) Discuss the scope, nature and role of managerial economics.
- 3) Explain the role and responsibility of managerial economist in business.
- 4) Discuss the opportunity cost concept and discounting concept of managerial economics.
- 5) Explain the equi-marginal concept of managerial economics.

2. SHORT QUESTIONS

- 1) What is the meaning of managerial economics?
- 2) State the factors influencing management decisions.
- 3) What is the nature of managerial economics?
- 4) What is the scope of managerial economics?
- 5) State the significance of managerial economics.
- 6) Explain the concept of an opportunity cost
- 7) What do you mean by Equi-marginal cost?
- 8) What is explicit cost?

Introduction of Managerial Economics

- 9) What do you mean by implicit cost?
- 10) State the meaning discounting cost

3. MULTIPLE CHOICE QUESTIONS

1. **Managerial economics generally refers to the integration of economic theory with business .._____**

- A. Ethics
- B. Management
- C. Practice
- D. All of the above

2. **Managerial Economics is _____**

- A. Dealing only micro aspects
- B. Only a normative science
- C. Deals with practical aspects
- D. All of the above

3. **_____demand forecasting is related to the business conditions prevailing in the economy as a whole.**

- A. Macro level
- B. Industry level
- C. Firm level
- D. None of these

4. **The function of combining the other factors of production is done by**

- A. land
- B. labour
- C. Capital
- D. Entrepreneurship

5. **_____is the base of marketing planning.**

- A. Demand Estimation
- B. Demand analysis
- C. Demand function
- D. Demand forecasting

6. **Basic economic tools of managerial economics do not include _____**

- A. Principle of time perspective
- B. Equi- marginal principle
- C. Incremental principle
- D. None of these

7. **What is the nature of Managerial economics?**

- A. Metrical.
- B. conceptual
- C. A and B Both
- D. None of Above

8. Economic profit refers to-----minus all relevant costs, both explicit and implicit.Profit

- A. Cost
- B. Expenses
- C. Revenues

9 focuses on the behavior of the individual actors on the economic stage, that is, firms and individuals and their interaction in markets.

- A. Macroeconomics
- B. Microeconomics
- C. Managerial Economics
- C. Economics

10. Opportunity cost is.

- A. A cost that cannot be avoided, regardless of what is done in the future.
- B. The cost incurred in the past before we make a decision about what to do in the future.
- C. That which we forgo, or give up, when we make a choice or a decision.
- D. The additional benefit of buying an additional unit of a product.

11. The opportunity cost of a machine which can produce only one product is:

- A. Low
- B. Infinite
- C. High
- D. Medium

12. It is defined as a state of knowledge in which one or more alternatives result in a set of specific outcomes but where the probabilities of the outcomes are neither known nor meaningful.

- A. Risk
- B. Uncertainty
- C. Peril
- D. All of the above

13. Opportunity cost is term which describes _____

- A. A bargain for a factor of production
- B. Costs related to an optimum level of production
- C. Average variable cost
- D. None of these

14. An input should be so allocated that the value added by the last unit is the same in all cases.

- A. Opportunity Cost Principle
- B. Equi-Marginal Principle
- C. Incremental Principle
- D. Discounting Principle

Introduction of Managerial Economics

- 15. One of the most important differences between a firm's economic profit and its accounting profit is the subtraction of:**
- A. Costs incurred when hiring labor, capital, and land.
 - B. Any explicit cost incurred by the entrepreneur for risk taking.
 - C. Any implicit charges for the use of capital owned by the entrepreneur.
 - D. Any taxes on the retained earnings of the firm.
- 16. Decision making and _____ are the two important functions of executive of business firms**
- A. Forward planning
 - B. Directing
 - C. Supervising
 - D. Administration
- 17. Which of the following is the characteristics of managerial economics?**
- A. Deals with both micro and macro aspects
 - B. Both positive and normative science
 - C. Deals with theoretical aspects
 - D. Deals with practical aspects.
- 18. What are the applications of opportunity cost?**
- A. Determining Economic Rent
 - B. Consumption Pattern Decisions
 - C. Determining Factor Prices
 - D. All of the above
- 19. "The purpose of managerial economics is to show how economic analysis can be used in formulating business policies". This definition is given by _____**
- A. Joel Dean
 - B. Henry and Hayne:
 - C. McNair and Meriam
 - D. All of the above
- 20. Managerial economics is primarily concerned with the application of economic principles and theories to ___ types of resource decisions made by all types of business organizations.**
- A. 5
 - B. 6
 - C. 7.
 - D. 10
- 21. The value of an entrepreneur's resources that she uses in production are known as:**
- A. Explicit costs.
 - B. Sunk costs.
 - C. Operating expenses.
 - D. Implicit costs.

22. What are the types of Opportunity Cost in production?:

- A. Explicit Cost
- B. Implicit Cost
- C. Marginal Opportunity Cost
- D. All of the Above

23. Which are the important relevant questions in the internal operation of a firm?

- A. What should be the production schedule for the coming year?
- B. What should be the profit budget for the coming year?
- C. What type of technology should be adopted in the specific process and specify it?
- D. All of the Above

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
C	D	A	D	D	D	C	C	B	C	A	B	D	B	C	A	D	D	A	A	D	D	D

2.1 PERFECT COMPETITION**2.1.1 FEATURES OF THE PERFECT COMPETITION****2.1.2 DEMAND CURVE FACING THE FIRM AND INDUSTRY
UNDER PERFECT COMPETITION****2.1.3 SHORT RUN EQUILIBRIUM OF A FIRM – MR-MC
METHOD:****2.1.4 SHORT RUN EQUILIBRIUM OF FIRM AND INDUSTRY****2.1.5 LONG RUN EQUILIBRIUM OF FIRM AND INDUSTRY****2.2 MONOPOLY****2.2.1 CHARACTERISTICS OF MONOPOLY****2.2.2 CAUSES FOR MONOPOLY****2.2.3 THE NATURE OF DEMAND AND MARGINAL
REVENUE CURVES UNDER MONOPOLY****2.2.4 PRICE AND OUTPUT UNDER MONOPOLY IN SHORT-
RUN****2.2.5 PRICE AND OUTPUT UNDER MONOPOLY IN LONG-
RUN EQUILIBRIUM****2.3 MONOPOLISTIC COMPETITION: FEATURES****2.3.1 NATURE OF DEMAND CURVE (AVERAGE REVENUE)
& MARGINAL REVENUE CURVES****2.3.2 CONCEPT OF INDUSTRY AND GROUP****2.3.3 THEORY OF GROUP EQUILIBRIUM****2.4 OLIGOPOLY****2.4.1 CLASSIFICATION OF OLIGOPOLY****2.4.2 CHARACTERISTICS OF OLIGOPOLY:****2.4.3 KINKED DEMAND CURVE****2.5 COURNOT'S MODEL OF DUOPOLY****2.5.1 THE COURNOT MODEL OF DUOPOLIES IN MANAGERIAL
ECONOMICS REACTION APPROACHES****2.5.2 CHAMBERLIN'S DUOPOLY MODEL**

❖ **Check Your Progress**

2.1 PERFECT COMPETITION:

Meaning: A Perfect Competition market is that type of market in which the number of buyers and sellers is very large, and all are engaged in buying and selling a homogeneous product without any artificial restrictions and they are possessing perfect knowledge of the market at a time.

In this connection Mrs. Joan Robinson has explained —"Perfect Competition prevails when the demand for the output of each producer is perfectly elastic."

2.1.1 Features of the Perfect Competition:

1. A Large Number of Buyers and Sellers:

The first condition is that the number of buyers and sellers must be so large that none of them individually is in a position to influence the price and output of the industry as a whole.

2. Homogeneity of the Product:

Each firm should produce and sell a homogeneous product so that no buyer has any preference for the product of any individual seller over others. If goods will be homogeneous then the price will also be uniform everywhere.

3. Free Entry and Exit of the Firms:

(The firm should be free to enter or leave the firm. If there is the hope of profit the firm will enter into business and if the loss is profitable, the firm will leave the business.) Please check

4. Perfect Knowledge of the Market:

Buyers and sellers must possess complete knowledge about the prices at which goods are being bought and sold and of the prices at which others are prepared to buy and sell. This will help in having uniformity in prices.

5. Perfect Mobility of the Factors of Production and Goods:

There should be perfect mobility of goods and factors between industries. Goods should be free to move to those places where they can fetch the highest price.

6. Absence of Price Control:

There should be complete openness in buying and selling goods. Here prices are liable to change freely in response to demand and supply conditions.

7. Perfect Competition among Buyers and Sellers:

In this purchasers and sellers have got complete freedom for bargaining, no restrictions in charging more or demanding less, competition feeling must be present there.

8. Absence of Transport Cost:

There must be an absence of transport cost. Having less or negligible transport costs will help the complete market in maintaining uniformity in price.

9. One Price of the Commodity:

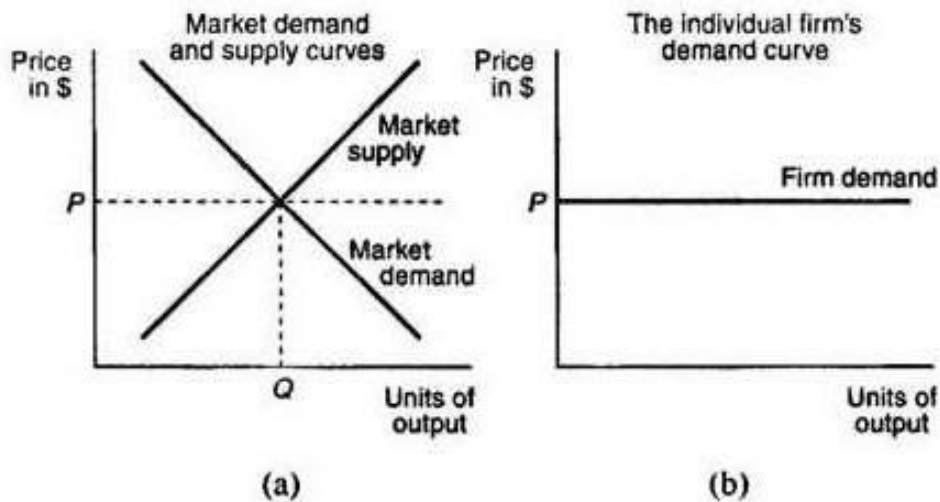
There is always one price of the commodity available in the market.

2.1.2 Demand curve Facing the Firm and Industry under Perfect competition

In a perfectly competitive market the market demand curve is a downward sloping line, reflecting the fact that as the price of an ordinary good increase, the quantity demanded of that good decreases. Price is determined by the intersection of market demand and market supply; individual firms do not have any influence on the market price in perfect competition. Once the market price has been determined by market supply and demand forces, individual firms become price takers. Individual firms are forced to charge the equilibrium price of the market or consumers will purchase the product from the numerous other firms in the market charging a lower price. The demand curve for an individual firm is thus equal to the equilibrium price of the market.

The demand and supply curves for a perfectly competitive market are illustrated in Figure 1 (a); the demand curve for the output of an individual firm operating in this perfectly competitive market is illustrated in Figure1 (b).

Figure 1 Market and Firm Demand Curves in a Perfectly Competitive Market



Note that the demand curve for the market, which includes all firms, is downward sloping, while the demand curve for the individual firm is flat or perfectly elastic, reflecting the fact that the individual takes the market price, P, as given. The difference in the slopes of the market demand curve and the individual firm's demand curve is due to the assumption that each firm is small in size. No matter how much output an individual firm provides, it will be unable to affect the market price.

Demand Curve for a Firm in a Perfectly Competitive Market: The demand curve for an individual firm is equal to the equilibrium price of the market. The market demand curve is downward-sloping.

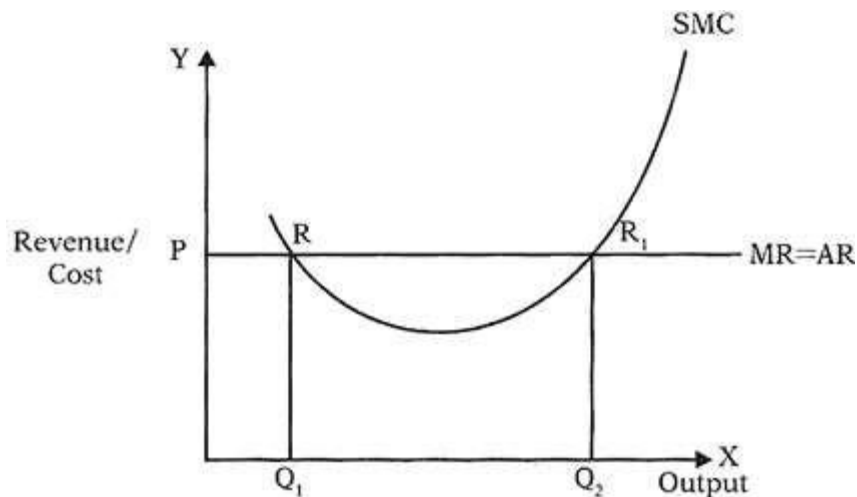
The demand curve for a firm in a perfectly competitive market varies significantly from that of the entire market. The market demand curve slopes downward, while the perfectly competitive firm's demand curve is a horizontal line equal to the equilibrium price of the entire market. The horizontal demand curve indicates that the elasticity of demand for the good is perfectly elastic. This means that if any individual firm charged a price slightly above market price, it would not sell any products.

A strategy often used to increase market share is to offer a firm's product at a lower price than the competitors. In a perfectly competitive market, firms cannot decrease their product price without making a negative profit. Instead, assuming that the firm is a profit-maximize, it will sell its goods at the market price.

2.1.3 Short Run Equilibrium of a Firm – MR-MC Method:

The MR-MC method is more often used to find out the equilibrium of a firm since it is simpler and accurate. In this method, we have to just locate the point at which MC intersects MR and the slope of MC is positive.

Figure 2 Equilibrium of Competitive Firm



The MR (= AR = P) curve is a straight line parallel to the quantity axis while the MC curve is a U- shaped one that can intersect the MR curve at more than one point.

- i. There are two points, R and R₁, at which the first-order condition, i.e. MR = MC, is satisfied.
- ii. At point R, the slope of SMC is less than that of MR since the SMC is downward sloping. This shows that the second-order condition is not satisfied at point R. Thus, equilibrium at this point or the output level OQ₁ will be unstable.
- iii. To show that the equilibrium is unstable, let us consider that output increases beyond OQ₁. As such, MC will further decline while MR will remain the same

and, hence, profit will rise. Thus, the firm will not return to OQ_1 level of output. This shows that the equilibrium at point R will be unstable.

- iv. At point R_1 , the slope of SMC is more than the slope of MR or, SMC is positively sloped. This satisfies the second-order condition. Hence, the equilibrium at R_1 will be stable at which the firm will produce OQ_2 level of output.
- v. If, for any reason, output increases beyond OQ_2 , the SMC becomes more than MR resulting in a loss to the firm. Hence, the firm will stick to point R_1 or OQ_2 output level. If the output level remains below OQ_2 , the firm will earn supernormal profit and, hence, increase the output up to OQ_2 . This shows that equilibrium once reached point R_1 will be a stable one. Any deviation from it will lead market forces to work in a fashion to return to OQ_2 level of output.

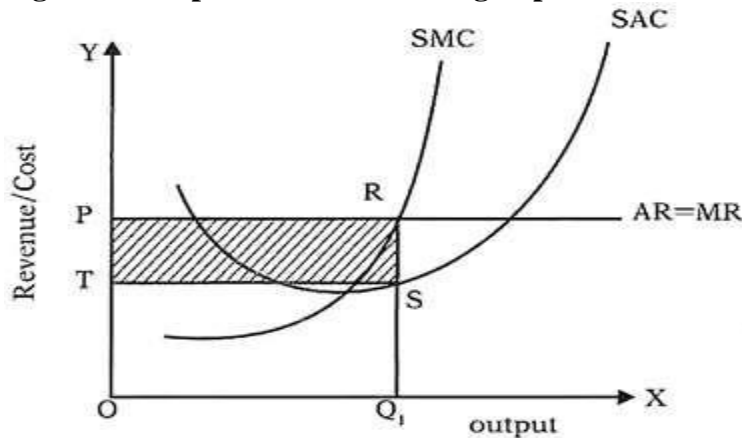
2.1.4 Short Run Equilibrium of Firm and Industry

In the short run, a firm may earn supernormal profit or normal profit or incur losses. Each of the three situations has been attempted in the following paragraphs:

i. Super Normal Profit:

A firm will earn supernormal profit in the short run if its SAC is less than the AR at the point of equilibrium. Such a firm has been depicted in Figure 2.

Figure 2 Competitive Firm Earning Supernormal Profit



It shows the firm's equilibrium at point R where its output is OQ_1 . At this point, both the equilibrium conditions are satisfied, i.e. $MR = MC$ and, the MC curve is positively sloped at the point of intersection. The average cost of the firm, as represented by the SAC curve, is $OT (= SQ_1)$ at this output level. Based on it, profit can be estimated as —

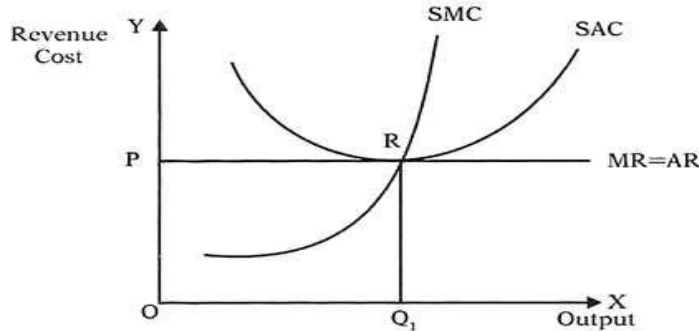
Total revenue – Total cost

Given that total revenue is $OPRQ_1$ and the total cost is $OTSQ_1$, Profit = $PTSR = OPRQ_1 - OTSQ_1$

This is the profit that the firm earns over and above the normal profit and, hence, termed as supernormal profit. It has been shown by the shaded area in the figure.

- ii. **Normal Profit:** Figure 4 depicts the case of a firm that has been earning only a normal profit.

Figure 4 Competitive Firm Earning Normal Profit



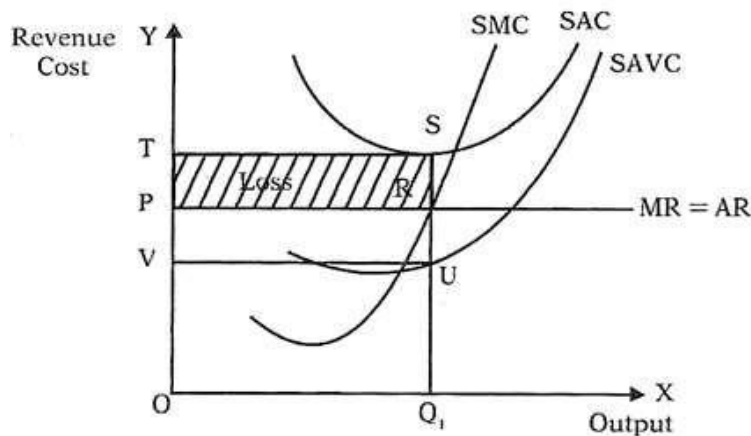
The figure shows equilibrium at point R where the output is OQ_1 . At this level of output, AC is RQ_1 , as shown by its SAC curve. It is equal to the per-unit revenue which is also RQ_1 . It means that firm is making only a normal profit which is a part of the average cost. In this case —

$$\text{Total revenue} = \text{Total cost} = OPRQ_1$$

- iii. **Firm Incurring Losses:**

A firm can incur a loss in the short run. Such a firm is represented in Figure 5.

Figure 5 Loss Making Competitive Firm



In the given situation, the firm's equilibrium is at point R where the output level is OQ_1 . The average cost of the firm is represented by the SAC curve and the average variable cost by the SAVC curve. The gap between SAC and SAVC will represent the average fixed cost (SAFC).

The figure 5 shows that at output level OQ_1 , the average cost (SQ_1) is more than its

average revenue (RQ_1). Thus, the firm has incurred a per-unit loss of $SR (= SQ_1 - RQ_1)$.

Total loss = Total cost – Total revenue

Given that total cost = $OTSQ_1$ and total revenue = $OPRQ_1$ in the figure, Total loss = $TSRP = OTSQ_1 - OPRQ_1$

In this situation, one may ask what a firm should do to minimize its losses. Should it continue production and bear the losses or should it stop production and wait for a higher price level to come for a re-entry in the market? Answer to such questions will depend upon the fact that, is the firm able to recover at least the variable cost from its revenue or not?

- i. If the firm can recover the variable cost or a little more, it should continue production and bear the loss which will be equal to or less than its fixed cost. In such a scenario, the firm will minimize losses by way of continuing production.
- ii. The firm will continue to do so in the short run even if $AR = SAVC$. It is because its loss will be equal to the fixed cost whether it stops production or continues to produce. In such a situation, the firm may be advised to continue the production and remain in the market.
- iii. However, if the $AR < SAVC$, the firm should stop production and minimize the loss which will be equal to its fixed cost. If the firm continues production, in this situation, per unit loss will be —

$AFC + (SAVC - AR) > AFC$ Since, $SAVC > AR$

Thus, it will minimize losses (= AFC) by stopping the production altogether.

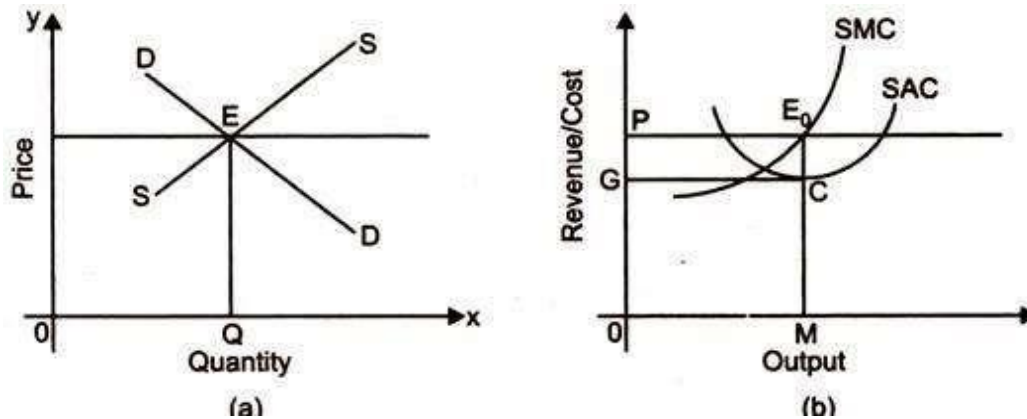
Based on the above, we can discuss two situations in which a firm will minimize losses (i) by continuing production and (ii) by stopping it altogether.

❖ **Short Run Equilibrium of the Industry:**

In the short run, new firms can neither enter the industry nor the old firm's exit from the industry. Therefore, the industry will be in equilibrium when the above given first two conditions are fulfilled. The short-run equilibrium of industry has been

shown in Fig. 6.

Figure 6 Short Run Equilibrium of the Industry



In part A of the Figure, the equilibrium of the industry has been shown. The demand curve and supply curve of the industry intersect each other at point E. OP is the equilibrium price and OQ is the equilibrium output.

The firm will take OP price as given and adjust its output in such a way that it may earn maximum profit. In part B of the diagram equilibrium of the firm has been shown. E₀ is the firm's equilibrium. OM is the equilibrium output. Average revenue and average cost are equal to E₀M and CM, respectively.

Since average revenue is greater than average cost, the firm is earning supernormal profit equal to area EOCGP. Suppose; cost of all the firms is identical, all the firms are earning normal profit. If the demand for the product declines, the price of the product will also decline and the equilibrium will be at a lower level of output. The industry will be in equilibrium, although firms might be incurring losses.

In this case, too the industry will be in short-run equilibrium.

2.1.5 Long Run Equilibrium of Firm and Industry

Therefore, the condition for long-run equilibrium of the firm can be written as:

$$\text{Price} = \text{Marginal Cost} = \text{Minimum Average Cost.}$$

Figure 7 Long-Run Equilibrium of the Firm under Perfect Competition

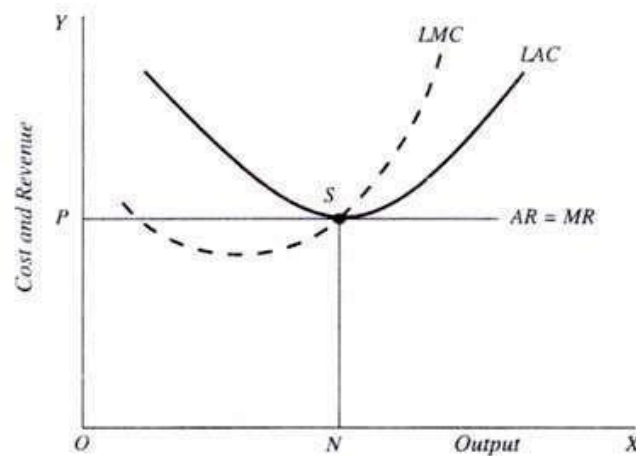


Fig. 7 represents the long-run equilibrium of the firm under perfect competition. The firm cannot be in long-run equilibrium at a price greater than OP in Fig. 7. This is because if the price is greater than OP , then the price line (demand curve) would lie somewhere above the minimum point of the average cost curve so that marginal cost and price will be equal where the firm is earning abnormal profits.

Since there will be a tendency for new firms to enter and compete away these abnormal profits, the firm cannot be in long-run equilibrium at any price higher than OP . Likewise, the firm cannot be in long-run equilibrium at a price lower than OP in Fig. 7 under perfect competition.

If the price is lower than OP , the average and marginal revenue curve will lie below the average cost curve so that the marginal cost and price will be equal at the point where the firm is making losses. Therefore, there will be a tendency for some of the firms in the industry to go out with the result that price will rise and the firms left in the industry make normal profits.

We, therefore, conclude that the firm can be in long-run equilibrium under perfect competition only when the price is at such a level that the horizontal demand curve (that is, AR curve) is tangent to the average cost curve so that price equals average cost and firm makes only normal profits

It should be noted that a horizontal demand curve can be tangent to a U-shaped average cost curve only at the latter's minimum point. Since at the minimum point of the average cost curve the marginal cost and average cost are equal, price in long-run equilibrium is equal to both marginal cost and average cost. In other words, the double condition of long-run equilibrium is fulfilled at the minimum point of the average cost curve.

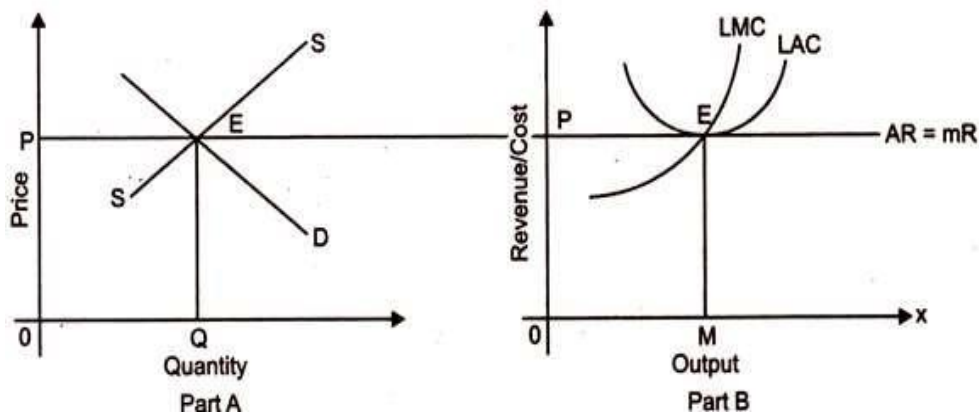
❖ **Long-Run Equilibrium of the Industry:**

The long-run is that period under which new firms can enter and old firms can leave the industry. If firms in the industry are earning supernormal profits, new firms will enter the industry. On the other hand, if the firms in the industry are incurring losses, then some existing firms will leave the industry.

Therefore, the industry will be in equilibrium, when the above-given conditions are fulfilled.

In part, A of Fig. 8. Industry equilibrium is shown. E is the equilibrium point. OP and OQ are the equilibrium level of price and output. The firms will adjust their output in such a way that they may earn maximum profits. In part B of Figure 8, the equilibrium of the firm has been shown.

Fig. 8 Long Run Equilibrium of the Industry



OM is the equilibrium level of output. The firm will get only normal profits because the LAC curve is tangent to the AR curve at the equilibrium level of output OM. If the cost curve of all the firms is identical all the firms in the industry will earn only normal profits. Under these circumstances, there will be no tendency for the firms to enter or leave the industry.

2.2 MONOPOLY: CHARACTERISTICS AND CAUSES

A monopoly is a market structure in which there is a single seller, there are no close substitutes for the commodity it produces and there are barriers to entry.

2.2.1 Characteristics of Monopoly

1. **Single Seller:** There is only one seller; he can control either price or supply of his product. But he cannot control demand for the product, as there are many buyers.
2. **No close Substitutes:** There are no close substitutes for the product. The buyers have no alternatives or choice. Either they have to buy the product or go without it.

3. **Price:** The monopolist has control over the supply to increase the price. Sometimes he may adopt price discrimination. He may fix different prices for different sets of consumers. A monopolist can either fix the price or quantity of output; but he cannot do both, at the same time.
4. **No Entry:** There is no freedom for other producers to enter the market as the monopolist is enjoying monopoly power. There are strong barriers for new firms to enter. There are legal, technological, economic, and natural obstacles, which may block the entry of new producers.
5. **Firm and Industry:** Under monopoly, there is no difference between firm and industry. As there is only one firm, that single firm constitutes the whole industry.

2.2.2 Causes for Monopoly

1. **Natural:** A monopoly may arise on account of some natural causes. Some minerals are available only in certain regions. For example, South Africa has the monopoly of diamonds; nickel in the world is mostly available in Canada and oil in Middle East. This is natural monopoly.
2. **Technical:** Monopoly power may be enjoyed due to technical reasons. A firm may have control over raw materials, technical knowledge, special know-how, scientific secrets and formula that enable a monopolist to produce a commodity. e.g., Coco Cola.
2. **Legal:** Monopoly power is achieved through patent rights, copyright and trade marks by the producers. This is called legal monopoly.
4. **Large Amount of Capital:** The manufacture of some goods requires a large amount of capital or lumpiness of capital. All firms cannot enter the field because they cannot afford to invest such a large amount of capital. This may give rise to monopoly. For example, iron and steel industry, railways, etc.
5. **State:** Government will have the sole right of producing and selling some goods. They are State monopolies. For example, we have public utilities like electricity and railways. These public utilities are undertaken by the State.

2.2.3 The Nature of Demand and Marginal Revenue Curves under Monopoly

But in the case of monopoly one firm constitutes the whole industry. Therefore, the entire demand of the consumers for a product faces the monopolist. Since the demand curve of the consumers for a product slopes downward, the monopolist faces a downward-sloping demand curve.

If he wants to increase the sale of his good, he must lower the price. He can raise the price if he is prepared to sacrifice some sales. To put it another way, a monopolist can lower the price by increasing his level of sales and output, and he can raise the price by reducing his level of sales or output.

A perfectly competitive firm merely adjusts the quantity of output it has to produce, price being a given and constant datum for him. But the monopolist encounters a more complicated problem. He cannot merely adjust quantity at a given price

because each quantity change by him will bring about a change in the price at which the product can be sold.

Consider Fig. 9. DD is the demand curve facing a monopolist. At price OP the quantity demanded is OM, therefore he would be able to sell OM quantity at price OP. If he wants to sell a greater quantity ON, then price to the OL. If he restricts his quantity to OG, fall price will rise to OH.

Thus every quantity change by him entails a change in price at which the product can be sold. Thus the problem faced by a monopolist is to choose a price-quantity combination which is optimum for him, that is, which yields him maximum possible profits.

Demand curve facing the monopolist will be his average revenue curve. Thus, the average revenue curve of the monopolist slopes downward throughout its length. Since average revenue curve slopes downward, marginal revenue curve will lie below it. This follows from usual average- marginal relationship. The implication of marginal revenue curve lying below average revenue curve is that the marginal revenue will be less than the price or average revenue.

Figure 9 Demand Curve of the Monopolist Slopes Downward

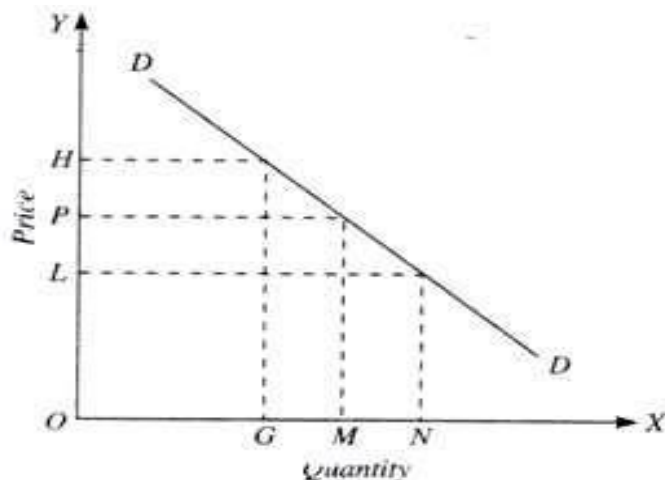
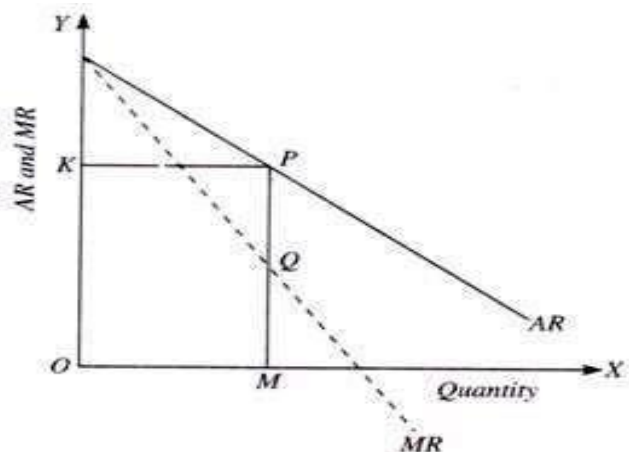


Figure 10 Average and Marginal Revenue Curves under Monopoly



When a monopolist sells more, the price of his product falls; marginal revenue therefore must be less than the price. In Fig. 10 AR is the average revenue curve of the monopolist and slopes downward. MR is the marginal revenue curve and lies below AR curve. At quantity OM, average revenue (or price) is MP and marginal revenue is MQ which is less than MP.

2.2.4 Price and Output under Monopoly in Short-Run

A. Short-run equilibrium:

The conditions for Equilibrium in Monopoly are the same as those under perfect competition. The marginal cost (MC) is equal to the marginal revenue (MR) and the MC curve cuts the MR curve from below. In this article, we will understand Equilibrium in Monopoly in detail.

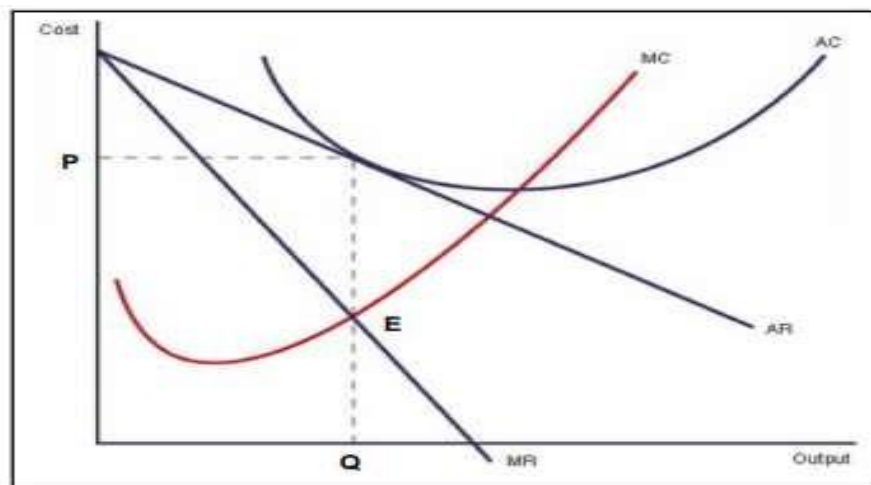
A Firm's Short-Run Equilibrium in Monopoly

1. The firm earns normal profits – If the average cost = the average revenue
2. It earns super-normal profits – If the average cost < the average revenue
3. It incurs losses – If the average cost > the average revenue

I. Normal Profits

A firm earns normal profits when the average cost of production is equal to the average revenue for the corresponding output.

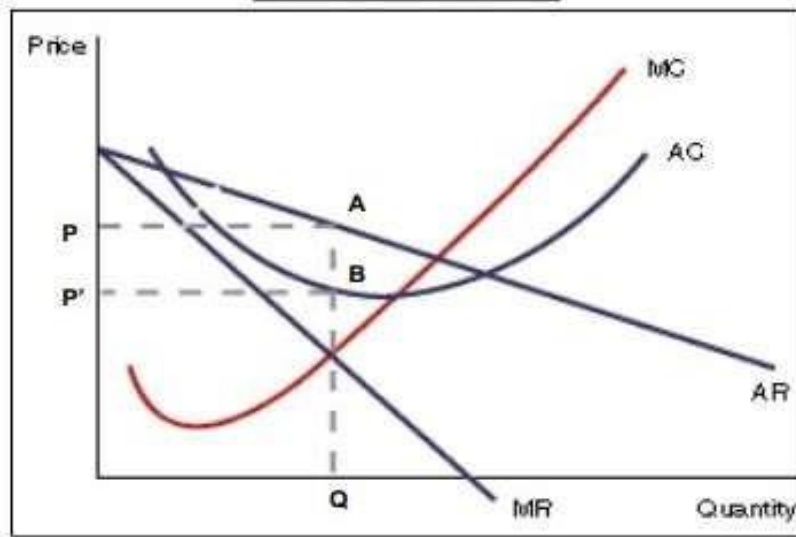
Figure 11 Normal Profits



II. Super-normal Profits

A firm earns super-normal profits when the average cost of production is less than the average revenue for the corresponding output.

Figure 12 Supernormal Profit



In the figure above, you can see that the price per unit = $OP = QA$. Also, the cost per unit = OP' . Therefore, the firm is earning more and incurring a lesser cost. In this case, the per-unit profit is

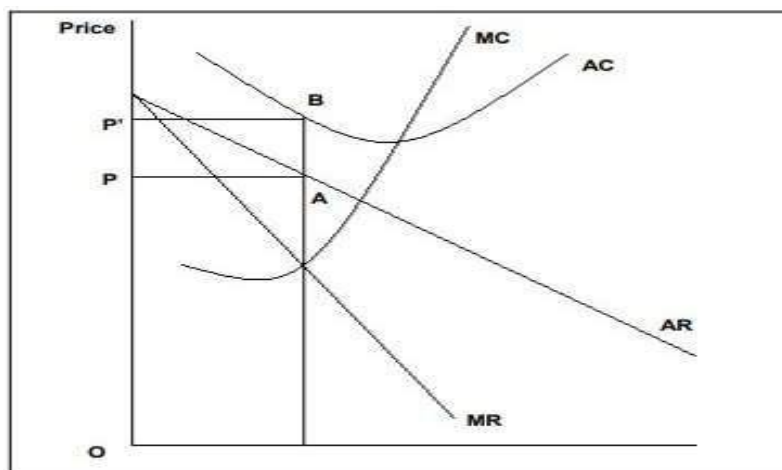
$$OP - OP' = PP'$$

Also, the total profit earned by the monopolist is $PP'BA$.

III. Losses

A firm earns losses when the average cost of production is higher than the average revenue for the corresponding output.

Figure 12 Loss situation



In the figure above, you can see that the average cost curve lies above the average revenue curve for the same quantity. The average revenue = OP and the average cost = OP' . Therefore, the firm is incurring an average loss of PP' and the total loss is $PP'BA$. In the short run, a monopolist sometimes sets a lower price and incurs losses

to keep new firms away.

2.2.5 Price and Output under Monopoly in Long-Run Equilibrium

In the long run, the monopolist would adjust the size of his plant. The long-run average cost curve and its corresponding long-run marginal cost curve portray the alternative plants, i.e., various plant sizes from which the firm has to choose for operation in the long run.

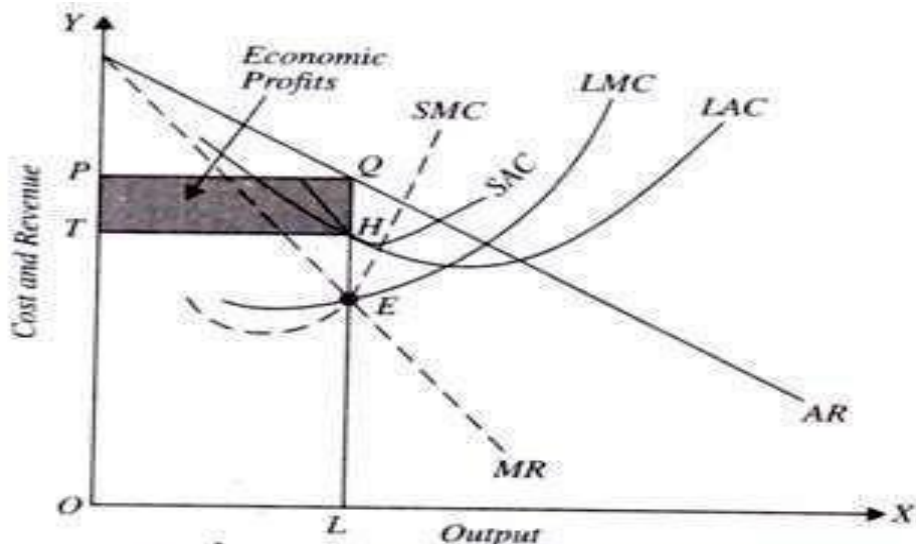
The monopolist would choose the plant size which is most appropriate for a particular level of demand. In the short run, the monopolist adjusts the level of output while working with a given existing plant. His profit-maximizing output in the short run will be where only the short-run marginal cost curve (i.e., marginal cost curve with the existing plant) is equal to marginal revenue.

But in the long run, he can further increase his profits by adjusting the size of the plant. So in the longrun he will be in equilibrium at the level of output where the given marginal revenue curve cuts the long-run marginal cost curve.

Fixing the output level at which marginal revenue is equal to long-run marginal cost shows that the size of the plant has also been adjusted. That is, a plant size has been chosen which is most optimal for a given demand for the product. It should be carefully noted that, in the long run, marginal revenue is also equal to short-run marginal cost.

Figure 14 portrays the long-run equilibrium of the monopolist. He is in equilibrium at OL output at which long-run marginal curve LMC intersects marginal revenue curve MR. Given the level of demand as indicated by positions of AR and MR curves, he would choose the plant size whose short- run average and marginal cost curves are SAC and SMC. He will be charging a price equal to LQ or OP and will be making profits equal to the area of rectangle THQP.

Figure 14 Long- Run Equilibrium under Monopoly



It, therefore, follows that for the monopolist to maximize profits in the long run, the following conditions must be fulfilled:

$$MR = LMC = SMCSAC = LAC$$

$$P \geq LAC$$

The last condition implies that in the long-run monopoly equilibrium price of the product should be either greater than the long-run average cost or at least equal to it. The price cannot fall below long-run average cost because in the long run, the monopolist will quit the industry if it is not even able to make normal profits.

2.3 MONOPOLISTIC COMPETITION: FEATURES

Monopolistic competition refers to the market situation in which a large number of sellers produce goods that are close substitutes for one another. The products are similar but not identical. The particular brand of the product will have a group of loyal consumers. In this respect, each firm will have some monopoly and at the same time, the firm has to compete in the market with the other firms as they produce a fair substitute. The essential features of monopolistic competition are product differentiation and the existence of many sellers.

The following are examples of monopolistic competition in the Indian context.

1. Shampoo - Sun Silk, Clinic Plus, Ponds, Chik, Velvette, Kadal, Head and Shoulder, Pantene, Vatika, Garnier, Meera
2. Tooth Paste - Binaca, Colgate, Forhans, Close-up, Promise, Pepsodent, Vicco Vajradanti, Ajanta, Anchor, Babool.

2.3.1 Nature of Demand Curve (Average Revenue) & Marginal Revenue Curves

The demand curve is relatively elastic, due to the availability of close substitutes in the monopolistic competition have limited power to decide and regulate the prices of their products.

This is because if sellers increase the prices of products, customers may switch to the nearest competitors to avail of the close substitutes.

Due to a large number of sellers with close substitute products, the level of competition is very high in the market. As a result, the demand curve shows a negative slope and relative elasticity. In other words, the demand curve is not perfectly elastic in monopolistic competition, but it is relatively elastic.

This is because the output generated by an organization is different from the output generated by other organizations, as the prices of their products are different. Each seller under a monopolistic competitive market can sell a wide range of output within a relatively narrow range of prices.

Consider Fig. 15. DD is the demand curve facing an individual firm under

monopolistic competition. At price OP the quantity demanded is OM. Therefore, the firm would be able to sell OM quantity at price OP. If it wants to sell a greater quantity ON, then it will have to reduce the price to OL. If it restricts its quantity to OG, the price will rise to OH. Thus, every quantity change entails a change in the price at which the product can be sold. Thus the problem faced by a firm working under monopolistic competition is to choose the price-quantity combination which is optimum for it, that is, which yields maximum possible profits.

The demand curve facing a firm will be his average revenue curve. Thus the average revenue curve of the monopolistically competitive firm slopes downward throughout its length. Since the average revenue curve slopes downward, the marginal revenue curve lies below it. This follows from the usual average- marginal relationship.

The implication of the marginal revenue curve lies below the average revenue curve is that the marginal revenue will be less than the price or average revenue. When a firm working under monopolistic competition sells more, the price of its product falls; marginal revenue, therefore, must be less than price. In Fig. 16 AR is the average revenue curve of the firm under monopolistic competition and slopes downward. MR is the marginal revenue curve and lies below the AR curve.

At quantity OM average revenue (or price) is OP and marginal revenue is MQ which is less than OP. That average and marginal revenues at a level of output are related to each other through price elasticity of demand and in this connection we derived the following formula:

$MR = AR (e - 1/e)$, where 'e' stands for price elasticity of demand.

Figure 15 Demand Curve Facing a monopolistically Competitive Firm

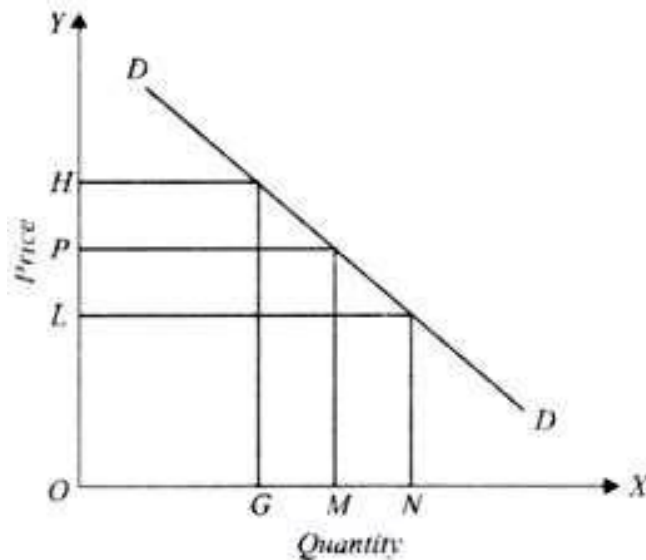
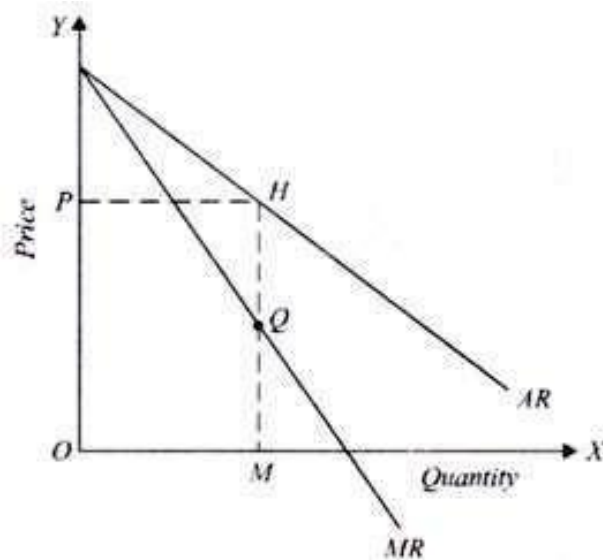


Figure 16 Average and marginal Revenue Curve under Monopolistic Competition



2.3.2 Concept of Industry and Group:

The word "industry" refers to all the firms producing a homogeneous product. But under monopolistic competition, the product is differentiated. Therefore, there is no "industry" but only a -group of firms producing a similar product. Each firm produces a distinct product and is itself an industry. Chamberlin lumps together firms producing very closely related products and calls them product groups.

So in defining an industry, Chamberlin lumps together firms in such product groups as cars, cigarettes, breweries, etc. According to Chamberlin, -Each producer within the group is a monopolist, yet his market is interwoven with those of his competitors, and he is no longer to be isolated from them.¶

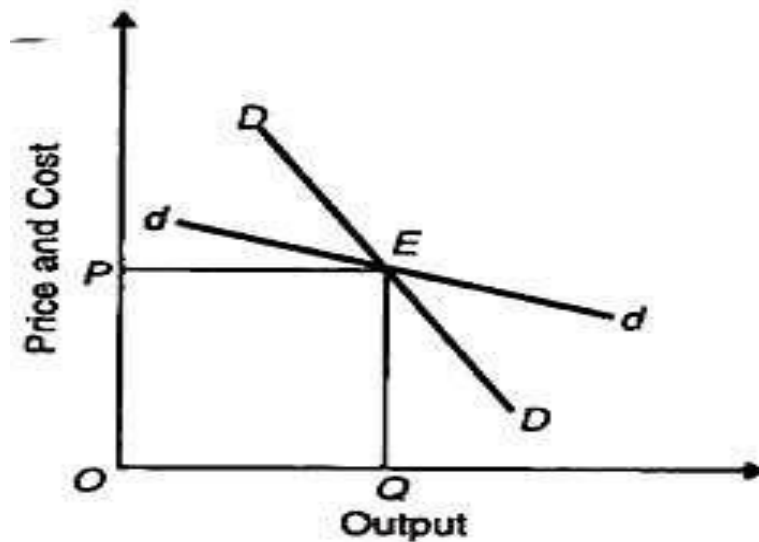
In the product group, the demand for each product has high cross elasticity so that when the price of other products in the group changes, it shifts the demand curve.

2.3.3 Theory of Group Equilibrium:

Chamberlin develops his theory of long-run group equilibrium using two demand curves DD and dd, as shown in Figure 17. The demand curve facing the group is DD. it is drawn on the assumption that all firms charge the same price and are of equal size, dd represents an individual firm's demandcurve.

The two demand curves reflect the alternatives that face the firm when it changes its price. In the figure, the firm is selling OQ output at OP price. As a member of the group with product differentiation, the firm can increase its sales by reducing its price for two reasons.

Figure 17



First, because it feels that the other firms will not reduce their prices; and second, it will attract some of their customers. On the other hand, if it increases its price above OP , its sales will be reduced because the other firms in the group will not follow it in increasing their prices and it will also lose some of its customers to the others. Thus the firm faces the more elastic demand curve dd . But if all firms in the product group reduce (or increase) their prices simultaneously, the firm will face the less elastic demand curve DD .

Assumptions of Chamberlin’s Group Equilibrium:

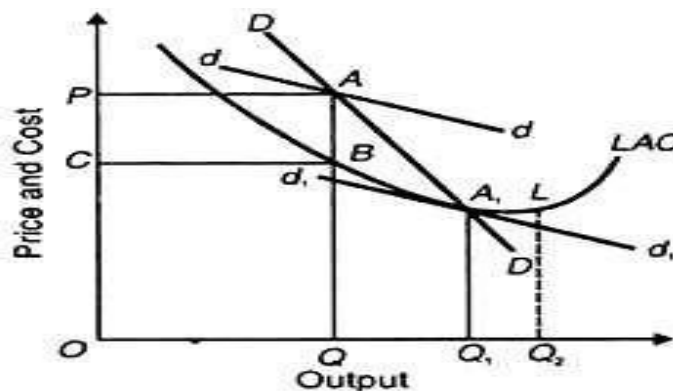
- (1) The number of firms is large.
- (2) Each firm produces a differentiated product which is a close substitute for the other’s product.
- (3) There are a large number of buyers.
- (4) Each firm has an independent price policy and faces a fairly elastic demand curve, at the sametime expecting its rivals not to take any notice of its actions.
- (5) Each firm knows its demand and cost curves.
- (6) Factor prices remain constant.
- (7) Technology is constant.
- (8) Each firm aims at profit maximization both in the short-run and the long run.
- (9) Any adjustment of price by a single firm produces its effect on the entire group so that the impact felt by anyone firm is negligible. This is the symmetry assumption.
- (10) As put forth by Chamberlin, there is the -heroic assumption|| that both demand and cost curves for all the products are uniform throughout the group. This is the uniformity assumption.
- (11) It relates to the long run.
- (12) No new firm can enter the group.

Explanation of Chamberlin's Group Equilibrium:

Given these assumptions and the two types of demand curves DD and dd , Chamberlin explains the group equilibrium of firms. He does not draw the MR curves corresponding to these demand curves and the Long run Marginal Cost curve (LMC) to the Long run Average Cost curve (LAC) to simplify the analysis.

Figure 18 represents the long-run equilibrium of the group under monopolistic competition. Adjustment of long-run equilibrium starts from point A where dd and DD curves intersect each other so that QA is the short-run equilibrium price level at which each firm sells OQ quantities of the product. At this price-output level, each firm earns $PABC$ super-normal profits.

Figure 18



Regarding dd as its demand curve, each firm applies a price cut to increase its sales and profits on the assumption that other firms will not react to its action. But instead of increasing its quantity demanded on the dd curve, each firm moves along the DD curve.

Every producer thinks and acts alike so that the dd curve “slides downward” along the DD curve. This downward movement continues until it takes the shape of the d_1d_1 curve and is tangent to the LAC curve at A_1 .

This is the long-run group equilibrium position where each firm would be earning only normal profits by selling OQ_1 quantities at Q_1A_1 price. If the d_1d_1 curve slides below the LAC curve, each firm would be incurring losses.

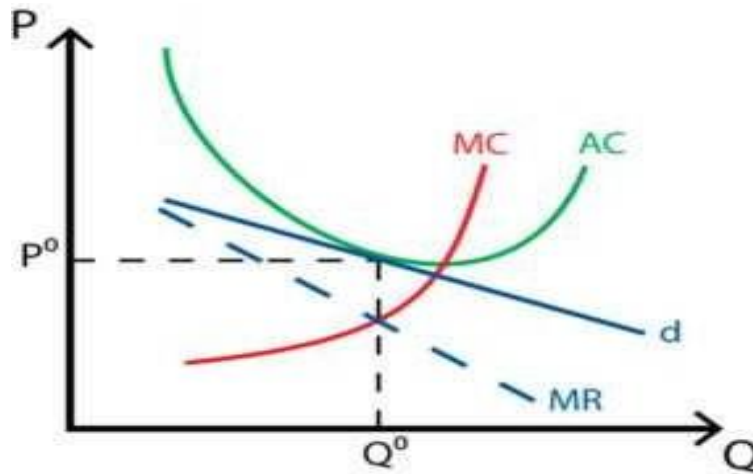
Such a situation cannot continue in the long run and the price would have to be raised to the level of A_1 to eliminate losses. Thus each firm will be of the optimum size and operate the optimum scale plant represented by the LAC curve and produce ideal or optimum output OQ_1 .

Equilibrium in the short-run

In the short run, as shown in the second figure, each firm will act as a monopolist in its market. Given their demand and cost curves, they will maximize profits by producing the level of output at which marginal cost equals marginal revenue. Whether they make profits or not will depend on the cost structure. In our example,

there are no profits.

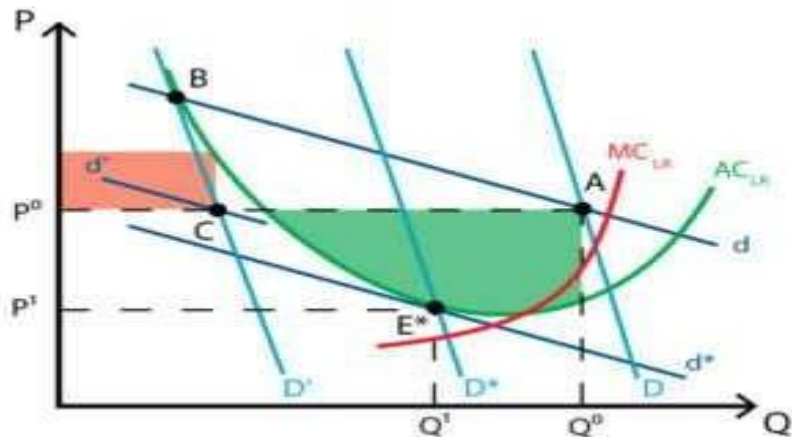
Figure 19



Equilibrium in the long-run

In the long run, the cost structure of the firm varies, allowing it to lower its prices to attract more customers. Let's start analyzing the equilibrium in the long run considering the firm is in this situation of equilibrium (A), and because of its profits, it has no incentives for changing its price. However, the extraordinary profits that the firm is making will attract new competitors to the market. Although aggregate demand in the market is maintained, the entrance of new firms will translate into a fall in the effective demand of the firm. This drop in the demand of the firm is illustrated by the shift of the demand curve to the left, from D to D' and a new equilibrium point will be reached at B. However, the firm will want to recover its previous profits levels and will therefore lower its price seeking to attract customers. The rest of the firms will follow the same strategy so no customers are lost, and therefore the changes in its competitors and own strategies will change the perceived demand of the firm, from d to d'. A new equilibrium will be reached at C but this time firms will be incurring losses, as the price will be below average cost. This loss of profits will cause the exit of firms from the market, displacing effective demand rightwards and perceived demand downwards, as each firm that remains in the market will increase their demand. This process will be repeated until the equilibrium point is reached, from D to D*. At this equilibrium point, E*, the demand curve will be tangent to the average cost in the long run and price set at this level. Profits will be equal to zero and hence no entry or exit of firms will occur.

Figure 20



Chamberlin's monopolistic competition model analyses a whole new market structure, apart from the classic monopoly and perfect competition. It demonstrates that in a market the number of firms can be irrelevant, and perfectly competitive results can be reached. In fact, in terms of welfare and product differentiation, monopolistic competition is desirable.

2.4 OLIGOPOLY

Oligopoly refers to a form of imperfect competition where there will be only a few sellers producing either homogenous or differentiated products. **For Example,** In India, there are several examples of Oligopoly like Airlines including Air India, Indian Airlines, Jet Airways, Sahara Airways, and Automobile producers including Maruti, Hindustan, Tata, Mahendra and Mahendra, and Cielo. There is a great deal of interdependence of these firms in a particular industry.

According to McConnel,

–Oligopoly is a market situation in which several firms in an industry, is so, small that each must consider the reactions of rivals in formulating its price policy."

2.4.1 Classification of Oligopoly:

The oligopoly can be classified as:

Based on Products: Perfect and Imperfect Oligopoly:

A perfect Oligopoly is that situation in which all firms in an industry produce homogenous products. It is also known as Pure Oligopoly.

On the other hand, an Imperfect Oligopoly is a market situation in which all firms produce differentiated products but close substitutes. Therefore, it is also known as a Differentiated Oligopoly.

Based on Entry of firms: Open and Closed Oligopoly:

Open oligopoly is a market situation in which there is no barrier to the entry of the firm in the industry. The entry of the firm is free.

But, in a Closed Oligopoly, there is a barrier to the entry of the firms in the industry. These barriers can be technological, legal, or any other type.

Based on Dominance: Partial or Full Oligopoly:

A partial oligopoly is a market situation in which there is a dominant firm in the industry. The dominant firm is known as the price leader. Thus, the dominant firm fixes the price and others follow that price.

In contrast, a Full oligopoly is a situation in which there is no dominant firm or price leader.

Based on Cooperation: Collusive and Non-collusive Oligopoly:

A collusive Oligopoly is a market in which firms cooperate in determining the price. Further, they follow a common price policy and do not compete with each other. In other words, it is a form of market in which there are few firms in the market and all decide to avoid competition through a formal agreement. Thus, they collude to form a cartel. In this, the Price and output of the member firms are fixed as a collective/cooperative decision. Sometimes, a leading firm in the market is accepted by the cartel as a price leader. Members of the cartel accept the price policy as specified by the price leader. It is also known as a Cooperative oligopoly.

On the other hand, a Non-Collusive Oligopoly is a market in which the firms act independently. They compete with each other and determine independently the price of their products. In other words, it is a market in which there are few firms in the market. Each firm pursues its price and output policy independent of the rival firms. Thus, every firm tries to increase its market share through competition. Here, competition refers to collusion as a means of profit maximization. Because, there are only a few big firms in the market, there is cut-throat competition. Therefore, in this market, aggressive advertisement develops through brand loyalty. Also, it can be known as a Non-collusive oligopoly.

2.4.2 Characteristics of Oligopoly:

Some of the characteristics of this market are:

A small number of big firms:

This market constitutes a small number of big firms. Thus, a firm enjoys partial control over price through brand loyalty. In this, Heavy advertisement creates brand loyalty. However, full control over price is not possible as there are competitors in the market. **For Example**, companies such as Maruti, Hyundai, Cielo, and Tata produce almost 90% of small cars in India.

A high degree of interdependence:

It is the main feature of this market. Here, Interdependence means that the firms are

affected by other firms' decisions. In this market, a small number of firms compete with each other. And, the sales of one firm depend on the firm's price and the price charged by other firms. If one firm lowers the price, its sales will increase due to a rise in demand by consumers. Consequently, the sales of other firms' will decrease. In such a situation, other firms also lower their prices. Accordingly, the profits of the first firm will decline. So, before taking any decision, firms have to consider the reactions of their rivals to the profits.

Therefore, the cross elasticity of demand is very high because it includes close substitutes. In short, the oligopoly firm has to consider the reactions of its rivals while determining its policies.

Difficult to determine the demand curve:

It is not possible to determine the demand curve in this market. This is because of a high degree of interdependence among the competing firms. Thus, when a firm lowers the price, the rivals also reduce the same immediately. The effect of this is difficult to trace. In other words, there is no specific response of demand to change in price. Consequently, it becomes difficult to draw any specific demand curve for this market.

Formation of Cartels in Oligopoly: Intending to avoid competition, the firms often make cartels. Here, a cartel means a formal agreement among the firms to avoid competition. It is a sort of collusion of competing firms but against the competition. Thus, under it, a group of different firms fixes the output and price.

Entry Barriers for new firms in Oligopoly:

Under this market, there are entry barriers for new firms. Generally, these are created through patent rights. Because of it, the existing firms don't have to worry about the new firms in the market.

Non-Price Competition:

Under this market, the firms tend to avoid price competition. Instead, they focus on non-price competition. To compete, firms use other methods such as offers with products to attract consumers. For example, Coke and Pepsi sell their product at the same price. But, both use aggressive non-price competition by sponsoring different games and sports.

2.4.3 Kinked Demand Curve

In many oligopolist markets, it has been observed that prices tend to remain inflexible for a very long time. Even in the face of declining costs, they tend to change infrequently. American economist Sweezy came up with the kinked demand curve hypothesis to explain the reason behind this price rigidity under oligopoly.

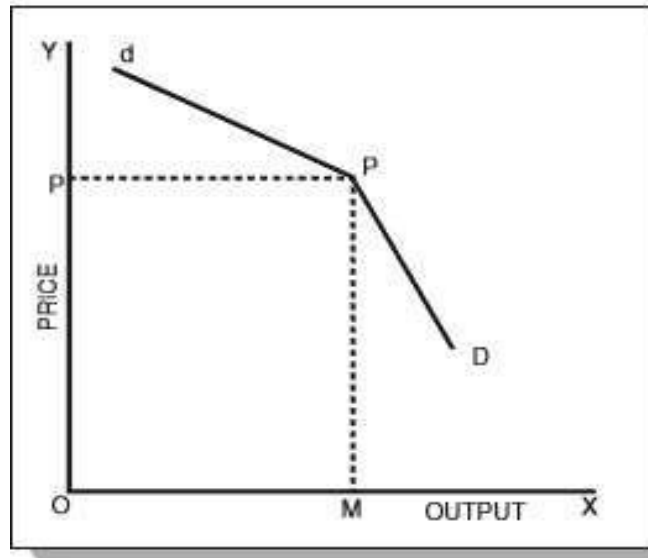
According to the kinked demand curve hypothesis, the demand curve facing an oligopolist has a kink at the level of the prevailing price. This kink exists because of two reasons:

1. The segment above the prevailing price level is highly elastic.

2. The segment below the prevailing price level is inelastic.

The following figure shows a kinked demand curve dD with a kink at point P .

Figure 21 Kinked Demand Curve under Oligopoly



From the figure, we know that

- i. The prevailing price level = P
- ii. The firm produces and sells output = OM
- iii. Also, the upper segment (dP) of the demand curve (dD) is elastic.
- iv. The lower segment (PD) of the demand curve (dD) is relatively inelastic.

This difference in elasticities is due to an assumption of the kinked demand curve hypothesis.

Why Price Rigidity under Oligopoly?

From what has been said above, it is easy to see why an oligopolist confronting a kinked demand curve will have no incentive to raise its price or to lower it. Since the oligopolist will not gain a large share of the market by reducing his price below the prevailing level and will have a substantial reduction in sales by increasing his price above the prevailing level, he will be extremely reluctant to change the prevailing price. In Fig. 22, the prevailing price is OP at which kink is found in the demand curve dKD . The price P will tend to remain stable or rigid as every member of the oligopoly will not see any gain in lowering it or in increasing it. It should be noted that if the prevailing price OP is greater than the average cost, more than normal profits will be made.

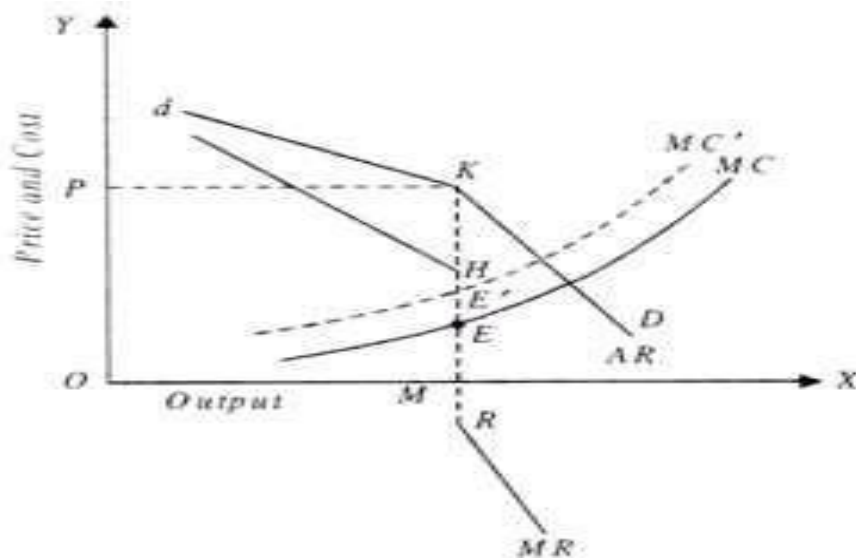
Further, it is worth mentioning that the oligopolist confronting a kinked demand curve will be maximizing his profits at the current price level. For finding the profit-

maximizing price-output combination, marginal revenue curve MR corresponding to the kinked demand curve dKD has been drawn. It is worth mentioning that the marginal revenue curve associated with a kinked demand curve is discontinuous, or in other words, it has a broken vertical portion.

The length of the discontinuity depends upon the relative elasticities of two segments dK and KD of the demand curve at point K. The greater the difference in the two elasticities, the greater the length of the discontinuity. In Fig. 22 marginal revenue curve MR corresponding to the kinked demand curve dKD has been drawn which has a discontinuous portion or gap HR.

Now, if the marginal cost curve of the oligopolist is such that it passes anywhere, say from point E, through the discontinuous portion HR of the marginal revenue curve MR, as shown in Fig. 22, the oligopolist will be maximizing his profits at the prevailing price level OP, that is, he will be in equilibrium at point E or the prevailing price OP. Since the oligopolist is in equilibrium, or other words, maximising his profits at the prevailing price level, he will have no incentive to change the price.

Figure 22



Furthermore, even if there are changes in costs, the price will remain stable so long as the marginal cost curve passes through the gap HR in the marginal revenue curve. In Fig. 22 when the marginal cost curve shifts upward from MC to MC' (dotted) due to the rise in cost, the equilibrium price and output remain unchanged since the new marginal cost MC' also passes from point E' through the gapHR.

2.5 COURNOT'S MODEL OF DUOPOLY

- The earliest duopoly model was developed in 1828 by the French economist Augustin Cournot. The original version is quite limited in that it assumes that the duopolists have identical products and identical costs. Cournot illustrated his

model with the example of two firms each owning a spring of mineral water, which is produced at zero costs.

❖ **Assumptions:**

- Cournot assumed that there are two firms. Thus it is a duopoly model.
- Cournot also assumed that there are two firms each owning a mineral well, and operating with zero costs. Thus this model applies to identical products and identical cost conditions.
- He also assumed that each firm acts on the perception that its competitor will not change its output, and decides its output to maximize profit.

❖ **To illustrate his model, Cournot assumed:**

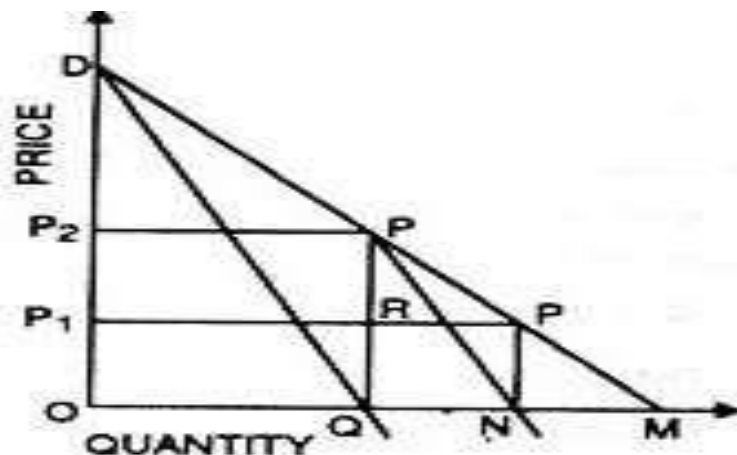
- (a) Two firms, each owing artesian mineral water well;
- (b) Both operate their wells at zero marginal cost²;
- (c) Both face a demand curve with a constant negative slope;
- (d) Each seller acts on the assumption that his competitor will not react to his decision to change his and price. This is Cournot's behavioral assumption.

Based on this model, Cournot has concluded that each seller ultimately supplies one-third of the market and charges the same price. While one-third of the market remains unsupplied.

❖ **Diagram Representation:**

Cournot's duopoly model is presented in Fig. 22. To begin the analysis, suppose that there are only two firms. A and B, and that, initially, A is the only seller of mineral water in the market. To maximize his profits (or revenue), he sells quantity OQ where his $MC = MR$, at price OP_2 . His total profit is OP_2PQ .

Figure 22 Price & Output Determination under Duopoly Cournot's Model



Now let B enter the market. The market open to him is QM which is half of the total market. He can sell his product in the remaining half of the market. He assumes that A will not change his price and output as he is making the maximum profit i.e.,

A will continue to sell OQ at price OP_2 . Thus, the market available to B is QM and the demand curve is PM.

When to get maximize revenue, B sells ON at price OP_1 , His total revenue is maximum at QRP'N. Note that B supplies only $QN = 1/4 = (1/2)/2$ of the market.) With the entry of B, the price falls to OP_1 . Therefore, A's expected profit falls to OP_1 PQ. Faced with this situation, an attempts to adjust his price and output to the changed conditions. He assumes that B will not change his output QN and price OP_1 as he is making maximum profit.

Accordingly, A assumes that B will continue to supply 1/4 of the market and he has $2/4 (= 1 - 1/4)$ of the market available to him. To maximize his profit. Supplies 1/2 of $(2/4)$, i.e., $2/8$ of the market. Note that A's market share has fallen from $1/2$ to $2/8$.

Now it is B's turn to react. Considering Cournot's assumption, B assumes that A will continue to supply only $2/8$ of the market, and the market open to him equals $1 - 2/8 = 5/8$.

To maximize his profit under the new conditions B supplies $1/2 \times 5/8 = 5/16$ of the market. It is now for A to reappraise the situation, adjust his price, and output accordingly.

This process of action and reaction continues in successive periods. In the process, A continues to lose his market share and B continues to gain. Finally, the situation is reached when their market shares equal $1/2$ each.

Any further attempt to adjust output produces the same result. The firms, therefore, reach their equilibrium position where each one supplies one-third of the market.

The equilibrium of firms, according to Cournot's model, has been presented in the table below:

Period	Firm A	Firm B
I		$\frac{1}{2}(1) = \frac{1}{2}$ $\frac{1}{2}\left(\frac{1}{2}\right) = \frac{1}{4}$
II	$\frac{1}{2}\left(1 - \frac{1}{4}\right) = \frac{3}{4}$	$\frac{1}{2}\left(1 - \frac{3}{8}\right) = \frac{5}{16}$
III	$\frac{1}{2}\left(1 - \frac{5}{16}\right) = \frac{11}{32}$	$\frac{1}{2}\left(1 - \frac{11}{32}\right) = \frac{21}{64}$
IV	$\frac{1}{2}\left(1 - \frac{11}{32}\right) = \frac{43}{128}$	$\frac{1}{2}\left(1 - \frac{43}{128}\right) = \frac{85}{256}$
-	-----	-----
-	-----	-----
-	-----	-----
N	$\frac{1}{2}\left(1 - \frac{1}{3}\right) = \frac{1}{3}$	$\frac{1}{2}\left(1 - \frac{1}{3}\right) = \frac{1}{3}$

Cournot's equilibrium solution is stable. For given the action and reaction, no two

sellers can increase their market share.

$$A's \text{ share} = 1/2(1 - 1/2) = 1/2.$$

Similarly B's share = $1/2(1 - 1/2) = 1/2$.

Cournot's model of duopoly can be extended to the general oligopoly. For example, if there are three sellers, the industry, and firms will be in equilibrium when each firm supplies 1/3 of the market. Thus, the three sellers together supply 2/3 of the market, 1/3 of the market remaining unsupplied. The formula for determining the share of each seller in an oligopolistic market is: $Q / (n + 1)$, where Q = market size, and n = number of sellers.

Criticism of the Model:

- (1) Cournot's behavioral assumption [assumption (d) above] is naive to the extent that it implies that firms continue to make wrong calculations about the competitor's behavior. Each seller continues to assume that his rival will not change his output even though he reportedly observes that his rival firm does change its output.
- (2) The assumption of zero cost of production is unrealistic. If this assumption is dropped, it does not alter his position.

2.5.1 The Cournot Model of Duopolies in Managerial Economics: Reaction Approaches

The Cournot model is used when firms produce identical or standardized goods and don't collide. Each firm assumes that its rivals make decisions that maximize profit. The Cournot duopoly model offers one view of firms competing through the quantity produced. Duopoly means two firms, which simplifies the analysis. The Cournot model assumes that the two firms move simultaneously, have the same view of market demand, have good knowledge of each other's cost functions, and choose their profit-maximizing output with the belief that their rival chooses the same way. With all these assumptions, you may wonder why not just assume the right answer. Unfortunately, it doesn't work that way. On the other hand, you may think that these assumptions are unrealistic. However, research has shown that decision-makers operating in the same market over an extended period tend to have similar views of market demand and good knowledge of one another's cost structure.

Given these assumptions, one firm reacts to what it believes the other firm will produce. In other words, if firm B produces q_B of output, what quantity should firm A produce? The Cournot reaction function describes the relationship between the quantity firm A produces and the quantity firm B produces. Here's how it works. The market demand curve faced by Cournot duopolies is:

$$P = 120 - 0.5Q_D$$

Where Q_D is the market quantity demanded and P is the market price in dollars.

Assuming firm A has a constant marginal cost of \$20 and firm B has a constant

marginal cost of \$24, the reaction function for each firm is derived by using the following steps:

1. Note that the market quantity demand, Q_D , must be jointly satisfied

by firms A and B. Thus,

$$Q_D = q_A + q_B$$

2. Substituting the equation in Step 1 for Q_D in the market demand curve yields

$$P = 120 - 0.5(q_A + q_B) = 120 - 0.5q_A - 0.5q_B$$

$$TR_A = P \times q_A = (120 - 0.5q_A - 0.5q_B) \times q_A = 120q_A - 0.5q_A^2 - 0.5q_Bq_A$$

3. For firm A, total revenue equals price multiplied by quantity.
4. Firm A's marginal revenue is determined by taking the derivative of total revenue, TR_A , concerning q_A .

Remember to treat q_B as a constant because firm A can't change the quantity of output produced by firm B.

5. Firm A maximizes profit by setting its marginal revenue equal to marginal cost.

$$MR_A = \frac{dTR_A}{dq_A} = 120 - q_A - 0.5q_B$$

Firm A's marginal cost equals \$20.

$$MR_A = 120 - q_A - 0.5q_B = 20 = MC_A$$

6. Rearranging the equation in Step 5 to solve for q_A gives firm A's reaction function.

$$120 - 20 - 0.5q_B = 100 - 0.5q_B = q_A$$

7. Repeat Steps 2 through 6 to determine firm B's reaction function.

Remember that firm B's marginal cost equals \$24.

$$TR_B = P \times q_B = (120 - 0.5q_A - 0.5q_B) \times q_B = 120q_B - 0.5q_Aq_B - 0.5q_B^2$$

$$MR_B = \frac{dTR_B}{dq_B} = 120 - 0.5q_A - q_B$$

$$MR_B = 120 - 0.5q_A - q_B = 34 = MC_B$$

$$120 - 34 - 0.5q_A = 86 - 0.5q_A = q_B$$

8. Substituting firm B's reaction function for q_B in firm A's reaction function enables you to solve for q_A .

$$100 - 0.5q_B = 100 - 0.5(86 - 0.5q_A) = q_A$$

$$100 - 43 + 0.25q_A = q_A$$

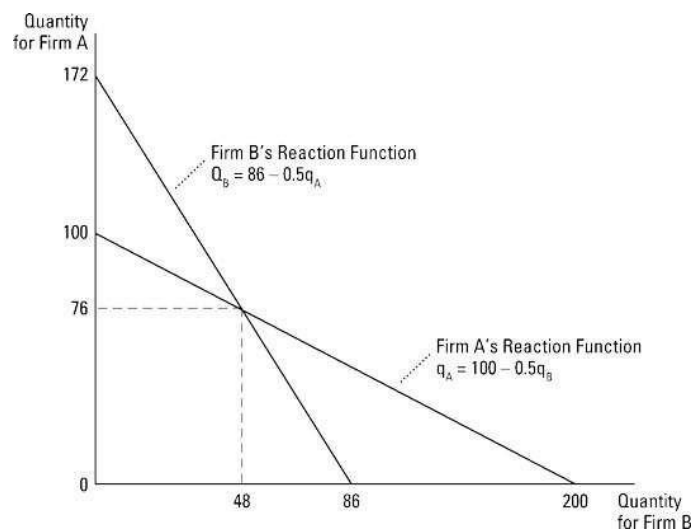
$$57 = 0.75q_A \text{ or } q_A = 76$$

9. Substituting $q_A = 76$ in firm B's reaction function enables you to solve for q_B .

$$86 - 0.5q_A = 86 - 0.5(76) = 48 = q_B$$

Thus, in the profit-maximizing Cournot duopolist, firm A, produces 76 units of output while firm B produces 48 units of output.

Figure 24



In the Cournot duopoly model, both firms determine the profit-maximizing quantity simultaneously. In the last example, firms A and B had different marginal costs. If the firms have the same marginal costs ($MC_A = MC_B$), each firm produces half the market output.

2.5.2 Chamberlin's Duopoly Model-

Chamberlin's model of duopoly recognizes interdependence of firms in such a market. Chamberlin argues that in the real world of oligopoly firms are not so naive that they will not learn from the past experience. However, he makes the same assumptions as the exponents of old classical models have done. In other words, his model is also based on the assumption of homogeneous products, firms of equal size with identical costs, no entry by new firms and full knowledge of demand.

Recognition of interdependence of firms in an oligopolistic market gives us a result quite different from that of Cournot. Chamberlin argues that firms are aware of the fact that their output or price decision will definitely invite reactions of other firms. Therefore, he does not visualize any price war in oligopolistic markets. He also rules out the possibility of firms adjusting their outputs over a period of time and thus reaching the equilibrium at an output level lower than that would be reached under monopoly.

According to Chamberlin, recognition of possible sharp reactions to an oligopolistic firm's price or output manipulations would avert harmful competition amongst the firms in such a market and would result in a stable industry equilibrium with the monopoly price and monopoly output. He further stated that no collusion is required for obtaining this solution.

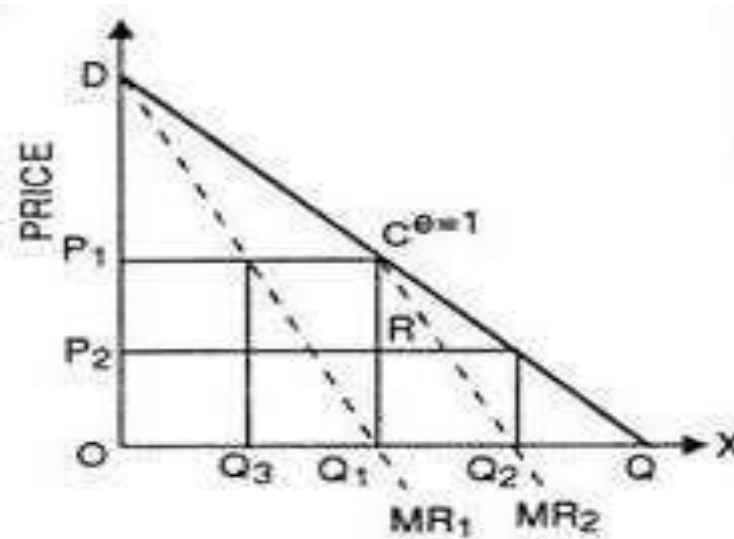
In case firms in an oligopolistic market are aware of their mutual dependence, and willing to learn from their past experience, then in order to maximize their individual and joint profits they will charge the monopoly price.

Chamberlin's model can be explained in the framework of a duopoly market. Chamberlin, like Cournot, assumes linear demand for the product. For simplicity we assume that even in this case the cost of producing the good is zero.

Chamberlin model has been illustrated in Figure 25. In this figure DQ is the market demand curve. If firm A is first to enter the market, it will produce output OQ_1 because at this level of output its marginal revenue is equal to marginal cost ($MR = MC = 0$). The firm can charge price OP_1 which is the monopoly price.

This will maximize its profits. At price OP_1 elasticity of demand is unity. Firm B entering market at this stage considers that its demand curve is CQ and will thus produce Q_1Q_2 so as to maximize its profit. It will charge price OP_2 .

Figure 25 Chamberlin's Model



It now realizes that it cannot sell QQ_1 quantity at the monopoly price and thus decides to reduce the output to QQ_2 , which is one-half of the monopoly output QQ_1 . Firm B can continue to produce quantity Q_1Q_2 which is same as Q_2Q_1 .

The industry output thus is OQ_1 and the price rises to the level OP_1 . This is an ideal situation from the point of view of both firms A and B. In this case, the joint output of the two firms is monopoly output and they charge monopoly price. Thus, considering the assumption of equal costs (costs = 0) the market will be shared equally between firms A and B.

❖ **CHECK YOUR PROGRESS**

1. LONG QUESTIONS

2. Discuss the kinked demand curve model of oligopoly.
3. What does equilibrium of firm mean? What are the conditions of short run equilibrium of a firm under perfect competition?
4. Explain with the diagram the nature of AR curve and MR curve under monopolistic competition.
5. State the Cournot's model of duopoly with reaction approaches.
6. What is the Oligopoly? Explain the characteristics and classification of oligopoly.
7. Discuss the Chamberlin's theory of group equilibrium.
8. State the features and the causes of monopoly and explain the price and output under monopoly in short run.
9. Discuss the features of Monopolistic Competition. Explain the concept of industry and group in Monopolistic Competition.

2. SHORT QUESTIONS

1. Distinguish between perfect competition and monopoly.
2. What are the assumptions of perfect competition?
3. Differentiate between monopoly and oligopoly.
4. What do you mean by kinked demand curve?
5. Describe features of oligopoly.
6. What are the classification of oligopoly?
7. What do you mean by group equilibrium?
8. What are the causes of monopoly?
9. What are the conditions under perfect competition?
10. What are the features of Monopolistic Competition?

3. MULTIPLE CHOICE QUESTIONS

1. **Under perfect competition, the demand curve is _____**
 - a. Upward sloping
 - b. horizontal
 - a. downward sloping
 - b. vertical
2. **In the long period _____**
 - a. All factors change
 - b. Only variable factor changes
 - c. Only fixed factor change
 - d. Variable and fixed factors remain constant.
3. **A firm can achieve equilibrium when its _____**
 - a. $MC = MR$
 - b. $MC = AC$
 - c. $MR = AR$
 - d. $MR = AC$
4. **The firm and industry are one and the same under _____**
 - a. Perfect competition
 - b. duopoly
 - c. oligopoly
 - d. monopoly
5. **Which of the following is a characteristic of a perfectly competitive market?**
 - a. Firms are price setters.
 - b. There are few sellers in the market.
 - c. Firms can exit and enter the market freely.
 - d. All of these
6. **When a perfectly competitive firm makes a decision to shut down, it is most likely that _____**

- a. Price is below the minimum of average variable cost.
 - b. Fixed costs exceed variable costs.
 - c. Average fixed costs are rising.
 - d. Marginal cost is above average variable cost.
7. **In the long run, a profit-maximizing firm will choose to exit a market when _____**
- a. Fixed costs exceed sunk costs.
 - b. Average fixed cost is rising.
 - c. Revenue from production is less than total costs.
 - d. Marginal cost exceeds marginal revenue at the current level of production.
8. **Equilibrium quantities in markets characterized by oligopoly is _____**
- a. Lower than in monopoly markets and higher than in perfectly competitive markets.
 - b. Lower than in monopoly markets and lower than in perfectly competitive markets.
 - c. Higher than in monopoly markets and higher than in perfectly competitive markets.
 - d. Higher than in monopoly markets and lower than in perfectly competitive markets.
9. **Price for a firm under monopolistic competition is _____.**
- a. equal to marginal revenue
 - b. greater than marginal revenue
 - c. less than marginal revenue
 - d. greater than total revenue
10. **In the long run, monopolistically competitive firms tend to experience.....**
- a. high economic profits
 - b. zero economic profits
 - c. negative economic profits
 - d. substantial economic losses
11. **Marginal revenue for a monopolist is _____**
- a. equal to price
 - b. greater than price
 - c. less than price
 - d. equal to average revenue
12. **Monopolists _____**
- a. Face downward sloping demand curves.
 - b. Are price takers.
 - b. Have no short-run fixed costs.
 - c. Maximize revenue, not profits.

- 13. The marginal revenue curve for a single-price monopoly _____**
- Lies below its demand curve.
 - Is horizontal.
 - Lies above its demand curve.
 - Coincides with its demand curve.
- 14. For a single-price monopoly, marginal revenue is _____ when demand is elastic and is _____ when demand is inelastic.**
- Negative; positive
 - positive; positive
 - positive; negative
 - negative; negative
- 15. Which of the following statements is true for both monopolistically-competitive and oligopolistic industries?**
- It is impossible for new firms to enter the industries.
 - Collusion and the creation of cartels is common.
 - Producers cannot benefit from knowing other firms' plans.
 - Firms have some degree of control over prices
- 16. Which of the following best describes an oligopoly?**
- many monopolistically competitive firms
 - a few firms sharing monopoly power
 - a former monopoly that has been broken up by the government
 - a government-granted franchise or monopoly
- 17. If a few firms share most of an entire industry's revenues, the market structure is most likely _____**
- monopolistically competitive
 - an oligopoly
 - perfectly competitive
 - a monopoly
- 18. Collusion most frequently occurs in industries that are _____**
- oligopolistic
 - monopolistically competitive
 - monopolistic
 - perfectly competitive
- 19. In the context of oligopoly, the kinked demand curve hypothesis is designed to explain _____**
- Price and output determination
 - Price rigidity
 - Price leadership
 - Collusion among rivals

20. Which of the following models results in the highest level of output assuming a fixed number of firms with identical costs and a given demand curve?

- a. COURNOT
- b. STACKELBERG
- c. MONOPOLY
- d. CARTEL

21. The Cournot Model of Oligopoly assumes that _____

- a. firms decide what quantity to produce.
- b. firms make their decisions simultaneously.
- c. firms do not cooperate.
- d. All of the above.

MCQ Answer

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
b	a	a	d	c	a	c	d	a	b	a	a	a	c	d	b	b	a	b	b	d

- 3.0 INTRODUCTION**
- 3.1 CHARACTERISTICS OF A BUSINESS CYCLE**
- 3.2 PHASES OF A BUSINESS CYCLE**
- 3.3 NATURE OF BUSINESS CYCLE**
- 3.4 TYPES OF BUSINESS CYCLE**
- 3.5 CAUSES OF BUSINESS CYCLES:**
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- 3.7 MEANING OF INFLATION**
 - 3.7.1 TYPES OF INFLATION**
- 3.8 CAUSES OF INFLATION**
 - 3.8.1 DEMAND-PULL INFLATION THEORY**
 - 3.8.2 COST-PUSH INFLATION THEORY:**
- 3.9 EFFECTS OF INFLATION**
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- 3.11 STAGFLATION**
- 3.12 THE INFLATIONARY GAP**
- 3.13 DEFLATION**
 - 3.13.1 CAUSES OF DEFLATION**
 - 3.13.2 MAIN EFFECTS AND OTHER EFFECTS OF DEFLATION ON THE ECONOMY**
 - 3.13.3 REMEDIAL MEASURES TO CONTROL OF DEFLATION**
- 3.14 DIFFERENCE BETWEEN INFLATION AND DEFLATION**
- ❖ CHECK YOUR PROGRESS**

3.0 INTRODUCTION

A capitalistic economy experiences fluctuations in the level of economic activity. And fluctuations in economic activity mean fluctuations in macroeconomic variables.

At times, consumption, investment, employment, output, etc., rise and at other times these macroeconomic variables fall.

Business Cycle, also known as the **economic** cycle or trade cycle, is the fluctuations in economic activities or rise and fall movement of gross domestic product (GDP) around its long-term growth trend.

No era can stay forever. The economy too does not enjoy the same periods all the time. Due to its dynamic nature, it moves through various phases. The change in business activities due to fluctuations in economic activities over a while is known as a business cycle. Business cycles are also called trade cycles or economic cycles. Business Cycle can also help you make better financial decisions.

The economic activities of a country include total output, income level, prices of products and services, employment, and rate of consumption. All these activities are interrelated; if one activity changes, the rest of them also change.

Definition of Business Cycle

According to economists, the period of prosperity and adversity will occur alternatively in every economy with almost a definite regularity. As a result, the business expansion and contraction respectively will take place in an economy. The fluctuations are periodical, differing in intensity and changing in its coverage. Many economists have defined the term.

Wesley Mitchell stated that

Business cycles are fluctuations in the economic activities of organized communities. The adjective "Business" restricts the concept of fluctuations in activities which was systematically conducted on a commercial basis. The noun "cycle" bars out fluctuations that do not recur with a measure of regularity.

According to Keynes A Trade cycle is composed of a period of good trade characterized by rising prices and low unemployment percentage, alternating with a period of bad trade characterized by falling prices and high unemployment percentage.

Tinbergen considers the occurrence of trade cycle as the interplay between erratic shocks and an economic system able to perform cyclical adjustments movements to such shocks.

Benham defines a trade Cycle as a period of prosperity followed by a period of depression.

According to P.A. Samuelson, The business cycle is a pulse common to most sectors of economic life and diverse countries.

3.1 CHARACTERISTICS OF A BUSINESS CYCLE

A business cycle is defined in various ways by different economists. For

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example, Mitchell defined it as a fluctuation in aggregate economic activity. According to Haberler,

The business cycle in the general sense may be defined as an alternation of periods of prosperity and depression, of a good and bad trade.

Cyclical Fluctuations Cyclical fluctuation is wave-like changes in economic activity characterized by recurring phases of expansion and contraction. These oscillating movements take the shape of waves from peak to trough and from trough to peak, as illustrated in the diagram.

One complete period of such oscillation is called a cycle. Cycles have a rhythm and are irregular. But they exhibit a recognized pattern of recurrent expansion and contractions.

1. Business Cycle occurs periodically — in a regular fashion.

This means prosperity and depression will be occurring alternatively. But there need not be uniformity in the extent and magnitude. It may not be perfect by rhythmical.

2. Business Cycle is all-embracing

The business cycle implies that the prosperity or depressionary effect of the phase will be affecting all industries in the entire economy and also the economics of other countries. It is international in character. The Great Depression of 1929 is an example of this.

3. Business Cycle is wave-like

It will have a set pattern of movements that is analogous to waves. Rising prices, production, employment, and prosperity will become the features of upward movement. Falling prices and employment will become the features of the downward movement.

4. The process of the Business Cycle is cumulative and self-reinforcing

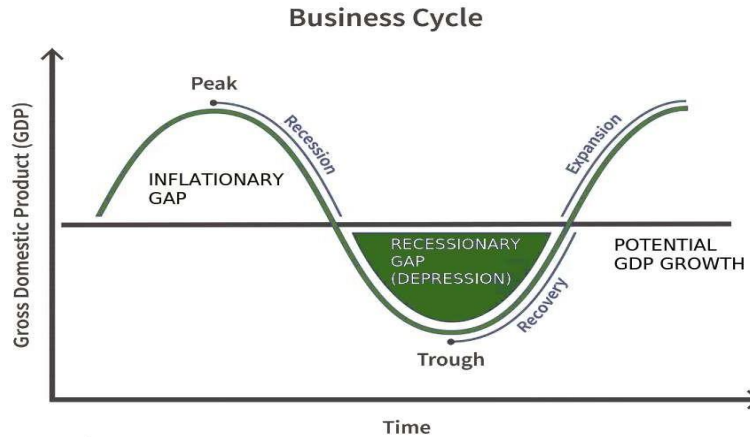
The upward and downward movements are cumulative in their process. When once the upward movement starts, it creates further movement in the same direction by feeding on itself. This momentum will persist till the forces accumulate to alter the direction and create the downward movement. When downward movement starts, it persists in the same direction leading to the worst depression and stagnation till it is retrieved to gain an upward movement.

5. The cycles will be similar but not identical

Different cycles and waves in the business cycles will be similar in general features, but they are not identical in all respects.

3.2 PHASES OF BUSINESS CYCLE

Figure 1



1. Depression or Trough:

The depression or trough is the bottom of a cycle where economic activity remains at a highly low level. Income, employment, output, price level, etc. go down. Depression is generally characterized by high unemployment of labour and capital and a low level of consumer demand about the economy's capacity to produce. This deficiency in demand forces firms to cut back production and lay off workers.

Thus, there develops a substantial amount of unused productive capacity in the economy. Even by lowering down the interest rates, financial institutions do not find enough borrowers. Profits may even become negative. Firms become hesitant in making fresh investments. Thus, an air of pessimism engulfs the entire economy, and the economy lands into the phase of depression. However, the seeds of recovery of the economy lie dormant in this phase.

2. Recovery:

Since trough is not a permanent phenomenon, a capitalistic economy experiences expansion, and, therefore, the process of recovery starts.

During the depression, some machines wear out completely and ultimately become useless. For their survival, businessmen replace old and worn-out machinery. Thus, the spending spree starts, of course, hesitantly. This gives an optimistic signal to the economy. Industries begin to rise and expectations tend to become more favorable. The pessimism that once prevailed in the economy now makes room for optimism. Investment becomes no longer risky. Additional and

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fresh investment leads to a rise in production.

Increased production leads to an increase in demand for inputs. Employment of more labour and capital causes GNP to rise. Further, low interest rates charged by banks in the early years of the recovery phase act as an incentive to producers to borrow money. Thus, investment rises. Now plants get utilized in a better way. The general price level starts rising. The recovery phase, however, gets gradually cumulative and income, employment, profit, price, etc., start increasing.

3. Prosperity:

Once the forces of revival get strengthened the level of economic activity tends to reach the highest point—the peak. A peak is the top of a cycle. The peak is characterized by an extensive optimism in the economy—income, employment, output, and price level tend to rise. Meanwhile, a rise in aggregate demand and cost leads to a rise in both investment and price levels. But once the economy reaches the level of full employment, additional investment will not cause GNP to rise.

On the other hand, demand, price level, and cost of production will rise. During prosperity, the existing capacity of plants is over utilized. Labour and raw material shortages develop. Scarcity of resources leads to rising costs. Aggregate demand now outstrips aggregate supply. Businessmen now come to learn that they have overstepped the limit. High optimism now gives birth to pessimism. This ultimately slows down the economic expansion and paves the way for contraction.

4. Recession:

Like depression, prosperity or peak can never be long-lasting. Speaking, the bubble of prosperity gradually dies down. A recession begins when the economy reaches a peak of activity and ends when the economy reaches its trough or depression. Between trough and peak, the economy grows or expands. A recession is a significant decline in economic activity spread across the economy lasting more than a few months, normally visible in production, employment, real income, and other indications.

During this phase, the demand of firms and households for goods and services starts to fall. No new industries are set up. Sometimes, existing industries are wound up. Unsold goods pile up because of low household demand. Profits of business firms dwindle. Output and employment levels are reduced. Eventually, this contracting economy hits the slump again. A recession that is deep and long-lasting is called depression and, thus, the whole process restarts.

The four-phased trade cycle has the following attributes:

- (i) Depression lasts longer than prosperity,
- (ii) The process of revival starts gradually,
- (iii) Prosperity phase is characterized by extreme activity in the business world,

(iv) The phase of prosperity comes to an end abruptly.

The period of a cycle, i.e., the length of time required for the completion of one complete cycle, is measured from peak to peak (P to P') and from trough to trough (from D to D'). The shortest of the cycle is called the 'seasonal cycle'.

3.3 NATURE OF BUSINESS CYCLE

The **nature of the business cycle** helps the organisation to be prepared for facing uncertainties of the business environment.

1. Cyclical nature

This is the periodic nature of a business cycle. Periodicity signifies the occurrence of the business cycle at regular intervals of time. However, periods of intervals are different for the different business cycle. There is a consensus that a normal business cycle can take 7 to 10 years to complete.

2. General nature

The general nature of a business cycle states that any change in an organisation affects all other organisations too in the industry. Thus, general nature regards the business world as a single economic unit.

For example, depression moves from one organisation to the other and spread throughout the industry. The general nature is also known as synchronism.

3.4 TYPES OF BUSINESS CYCLE

Prof. James Arthur and Schumpeter classified the business cycle into three types based on the underlying period of existence of the cycle as follows:

1. **Short Term (Kitchin) Cycle** (very short or minor period of the cycle, approximately 40 months duration (2 to 4 years), it results from the changes in business inventories
2. **Medium – Term (Juglar) cycle** (major cycles, composed of three minor cycles and a duration of 10 years or so), refers to new business investment.
3. **Long-term (Kondratieff) Wave** (very long waves of the cycle, made up of six major cycles and takes more than 60 years to run its course of duration) results from technological innovation.

3.5 CAUSES OF BUSINESS CYCLES:

During the last several hundred years, philosophers, economists, stockbrokers, and men in the street have tried to give various causes of business cycles. Some attribute them to monetary and non-monetary factors while others to

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psychological factors. Samuelson attributes business cycles to external and internal factors which we explain below.

3.5.1 External Factors:

The external factors emphasise the causes of business cycles in the fluctuations of something outside the economic system. Such external factors are sunspots, wars, revolutions, political events, gold discoveries, and the growth rate of population, migrations, discoveries, and innovations.

These outside factors change the level of national income by affecting either the investment or consumption component of aggregate demand. For example, a drought that destroys many crops due to sunspots may reduce the number of goods produced in the country and adversely affect both consumption and investment.

An innovation by opening the door to new markets, raw materials, products, and production processes encourages new investments in plants and equipment. Inventions of railroads, electricity, the telephone, automobiles, TVs, computers, etc. have led to the burst of investments in both capital and consumer goods from time to time.

Discoveries of gold, oil, and natural resources have led to large-scale investments. Similarly, population expansion and migrations are the causes of huge investments in both housing and other infrastructure and consumer durables. All the above noted external factors have been responsible for booms in business cycles from time to time.

3.5.2 Internal Factors:

The internal factors relate to –mechanisms within the economic system itself which will give rise to self-generating business cycles, so that every expansion will breed recession and contraction, and every contraction will in turn breed revival and expansion, in a quasi-regular, repeating, and never-ending chain. Haberler divides the internal factors into monetary and non-monetary which we briefly explain.

1. Bank Credit:

Hawtrey, Friedman, and other monetarists regard business cycles as "a purely monetary phenomenon". According to Hawtrey, cyclical fluctuations are caused by the expansion and contraction of bank credit. These in, turn, lead to changes in the demand for money on the part of producers and traders. Bank credit is the principal means of payment. Credit is expanded or reduced by the banks by lowering or raising the rate of interest or by purchasing and selling securities to traders. This increases or decreases the supply of money in the economy. An increase in the money supply brings about prosperity and a decrease in the money supply leads to depression.

2. Over-Saving or Under Consumption:

According to economists like Hobson, Foster, and Douglas, business cycles are caused by over- saving or under-consumption. They argue that wide disparities of income and wealth lead to depression in the country. The rich people are not able to spend their entire income. So they save more and invest more in producing consumer goods. On the other hand, poor people have low incomes or wages.

As a result, their demand for consumer goods is low which means that there is under-consumption. According to Hobson, over-saving leads to the production of consumer goods in large quantities and a boom. But under-consumption on the part of the workers due to low wages brings a fall in the demand for consumer goods. Stocks pile up at the current level of prices. These, in turn, lead to a fall in the prices of consumer goods and the income of the producers. As a result, depression sets in.

3. Over-Investment:

Hayek Spiethoff, Cassel, and Robertson find the root cause of business cycles in overinvestment. According to Hayek, it is bank loans that lead to over-investment in capital goods industries relative to consumer goods industries that ultimately bring depression in the economy.

When the total money supply exceeds the amount of voluntary savings, it leads to an increase in the investment activity and ultimately to a boom. But banks cannot continue to give credit for long due to the shortage of voluntary savings. As a result, production will decline which will bring about a depression. Thus it is over-investment in the capital goods industries which is the cause of a boom and a depression.

4. Competition:

According to Chapman, the main cause of business cycles is the existence of competition in an economy which leads to over-production and ultimately to a crisis (depression). Under competitive conditions, firms produce in anticipation of demand.

The profit motive attracts new firms. Production increases and boom starts. Competition and profits lead to overproduction and glut of commodities in the market and a fall in prices. On the other hand, the race to produce more and profit more on the part of producers increases the demand for factors of production. Competition among producers to hire more factors raises their prices. Thus costs rise which raises the prices of products. Demand falls and there is a glut of commodities which eventually leads to a fall in prices and a depression.

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5. Psychological Causes:

According to Pigou, the alternating waves of "over-optimism" and "over pessimism" are the sole causes of the industrial fluctuations. He traces cyclical fluctuations to the tendency of businessmen to react excessively to the changing conditions of the economy. It is this tendency that causes alternating periods of over-production and under-production.

Errors of optimism and pessimism are interacting forces. As soon as the business community discovers that it has made an error of optimism, it tries to correct it by making errors of pessimism. Each phase of the cycle produces a state of psychology which produces forces that bring about the reversal of that psychology and in turn another reversal. These alternating waves of over-optimism (over-production) and over-pessimism (under-production), as a result of these reversals, are the main causes of business cycles.

6. Innovations:

According to Schumpeter, innovations in the structure of an economy are the source of economic fluctuations. To him, "the cause of depression is prosperity." The boom consists in the carrying out of innovations in the industrial and commercial fields. The cyclical upswing is set in motion when an innovator starts investing in his innovation of a new product.

This enables him to make a profit soon other entrepreneurs adopt this new product in "swarm-like clusters". Innovations in one field induce innovations in related fields. There is a large increase in the output of new products. Consequently, money incomes and prices rise and help to create a cumulative expansion in the economy. Over-optimism adds further to the boom.

When there is a glut of new products in the market, their prices fall, and the profit margins of entrepreneurs are reduced. Banks ask for repayment of loans. The quantity of money is reduced and prices fall further. Some entrepreneurs cut down production and others are forced into liquidation. Thus the economy enters into depression.

7. Marginal Efficiency of Capital (MEC):

According to Keynes, the cycle consists primarily of fluctuations in the rate of investment. And fluctuations in the rate of investment are caused mainly by fluctuations in the MEC. The MEC depends on the supply price of capital assets and their prospective yield.

The supply price of capital assets being stable in the short-run, the MEC is determined by the prospective yield of capital assets. The prospective yield, in turn, depends on business expectations. Fluctuations in the rate of investment are also caused by fluctuations in the rate of interest. But it is fluctuations in the MEC which are the principal cause of cyclical fluctuations.

3.6 GENERAL MEASURES TO CONTROL BUSINESS CYCLES OR STABILISATION POLICIES

Various measures have been suggested and put into practice from time to time to control fluctuations in an economy. They aim at stabilizing economic activity to avoid the ill effects of a boom and a depression. The following three measures are adopted for this purpose.

1. Monetary Policy:

Monetary policy as a method to control business fluctuations is operated by the central bank of a country. The central bank adopts several methods to control the quantity and quality of credit. To control the expansion of the money supply during a boom, it raises its bank rate, sells securities in the open market, raises the reserve ratio, and adopts many selective credit control measures such as raising margin requirements and regulating consumer credit. Thus the central bank adopts a dear money policy. Borrowings by business and trade become dearer, difficult and selective. Efforts are made to control excess money supply in the economy.

To control a recession or depression, the central bank follows an easy or cheap monetary policy by increasing the reserves of commercial banks. It reduces the bank rate and interest rates of banks. It buys securities in the open market. It lowers margin requirements on loans and encourages banks to lend more to consumers, businessmen, traders, etc.

Limitations of Monetary Policy:

But monetary policy is not so effective as to control a boom and a depression. If the boom is due to cost-push factors, it may not be effective in controlling inflation, aggregate demand, output, income, and employment. So far as depression is concerned, the experience of the Great Depression of the 1930s tells us that when there is pessimism among businessmen, the success of the monetary policy is practically nil.

In such a situation, they do not have any inclination to borrow even when the interest rate is very low. Similarly, consumers who are faced with reduced incomes and unemployment cut down their consumption expenditure. Neither the central bank nor the commercial banks can induce businessmen and consumers to raise the aggregate demand. Thus the success of monetary policy to control economic fluctuations is severely limited.

2. Fiscal Policy:

Monetary policy alone is not capable of controlling business cycles. It should, therefore, be supplemented by compensatory fiscal policy. Fiscal measures are highly effective for controlling excessive government expenditure, personal

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consumption expenditure, and private and public investment during a boom. On the other hand, they help in increasing government expenditure, personal consumption expenditure, and private and public investment during a depression.

Policy during Boom:

The following measures are adopted during a boom. During a boom, the government tries to reduce unnecessary expenditure on non-development activities to reduce its demand for goods and services. This also puts a check on private expenditure which is dependent on the government's demand for goods and services. But it is difficult to cut government expenditure. Moreover, it is not possible to distinguish between essential and non-essential government expenditure. Therefore, this measure is supplemented by taxation.

To cut personal expenditure, the government raises the rates of personal, corporate, and commodity taxes.

The government also follows the policy of having a surplus budget when the government revenues exceed expenditures. This is done by increasing the tax rates or reducing government expenditure or both. This tends to reduce income and aggregate demand through the reverse operation of the multiplier. Another fiscal measure that is usually adopted is to borrow more from the public which has the effect of reducing the money supply with the public. Further, the repayment of public debt should be stopped and postponed to some future date when the economy stabilizes.

Policy during Depression:

During a depression, the government increases public expenditure, reduces taxes, and adopts a budget deficit policy. These measures tend to raise aggregate demand, output, income, employment, and prices. An increase in public expenditure increases the aggregate demand for goods and services and leads to an increase in income via the multiplier. The public expenditure is made on such public works as roads, canals, dams, parks, schools, hospitals, and other construction works.

They create demand for labour and the products of private construction industries and helps in reviving them. The government also increases its expenditure on such relief measures as unemployment insurance, and other social security measures to stimulate the demand for consumer goods industries. Borrowing by the government to finance budget deficits utilizes idle money lying with the banks and financial institutions for investment purposes.

3. Direct Controls:

Direct controls aim to ensure the proper allocation of resources for price stability. They are meant to affect strategic points of the economy. They affect particular consumers and producers. They are in the form of rationing licensing, price and

wage controls, export duties, exchange controls, quotas, monopoly control, etc. They are more effective in overcoming bottlenecks and shortages arising from inflationary pressures. Their success depends on the existence of an efficient and honest administration. Otherwise, they lead to black marketing, corruption, long queues, speculation, etc. Therefore, they should be resorted to only in emergencies like war, crop failures, and hyper-inflation.

3.7 MEANING OF INFLATION

Inflation is a consistent and appreciable rise in the general price level. In other words, inflation is the rate at which the general level of prices for goods and services is rising and consequently the purchasing power of currency is falling.

Definitions

“Too much Money chasing too few goods”- Coulbourn

“A state of abnormal decrease in the quantity of purchasing power” – Gregorye

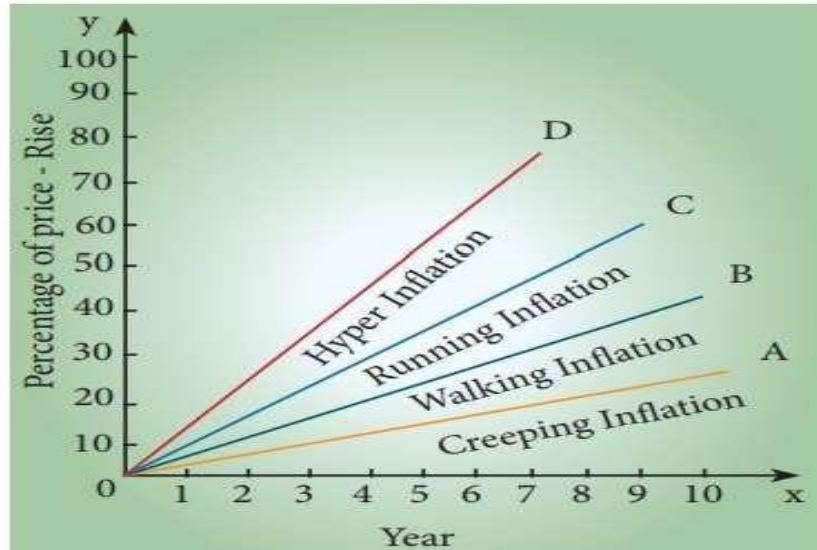
3.7.1 Types of Inflation

(i) Creeping inflation (ii) Walking inflation (iii) Running inflation and (iv) Galloping inflation or Hyperinflation.

The four types of inflation are indicated in Figure-2.

- i) Creeping Inflation:** Creeping inflation is slow-moving and very mild. The rise in prices will not be perceptible but spread over a long period. This type of inflation is in no way dangerous to the economy. This is also known as mild inflation or moderate inflation.
- ii) Walking Inflation:** When prices rise moderately and the annual inflation rate is a single digit (3% - 9%), it is called walking or trolling inflation.
- iii) Running Inflation:** When prices rise rapidly like the running of a horse at a rate of speed of 10% - 20% per annum, it is called running inflation.
- iv) Galloping inflation:** Galloping inflation or hyperinflation points out unmanageably high inflation rates that run into two or three digits. By high inflation the percentage of the same is almost 20% to 100% from an overall perspective.

Figure 2



Other Types of Inflation

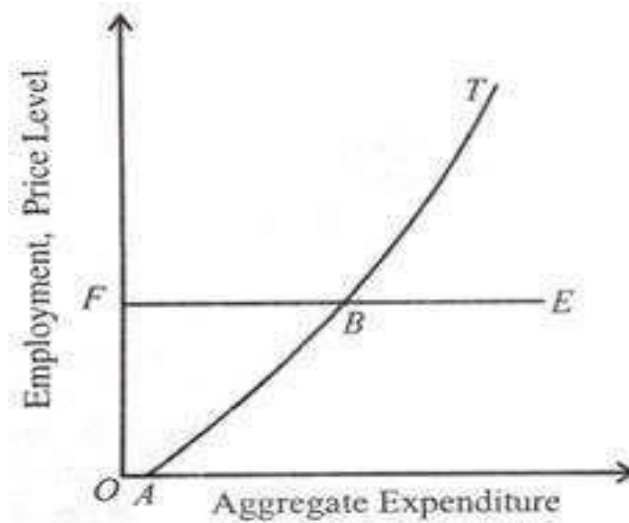
• **Semi-Inflation:**

According to Keynes, so long as there are unemployed resources, the general price level will not rise as output increases. But a large increase in aggregate expenditure will face shortages of supplies of some factors which may not be substitutable. This may lead to an increase in costs, and prices start rising. This is known as semi-inflation or bottleneck inflation because of the bottlenecks in supplies of some factors.

• **True Inflation:**

According to Keynes, when the economy reaches the level of full employment, any increase in aggregate expenditure will raise the price level in the same proportion. This is because it is not possible to increase the supply of factors of production and hence of output after the level of full employment. This is called true inflation. The Keynesian semi-inflation and true inflation situations are illustrated in Figure.3.

Figure.3.



Employment and price level are taken on the vertical axis and aggregate expenditure on the horizontal axis. FE is the full employment curve. When with the increase in aggregate expenditure, the price level rises slowly from A to the full employment level B, this is semi-inflation. But when the aggregate expenditure increases beyond point B the price level rises from B to T in proportion to the increase in aggregate expenditure. This is true inflation.

- **Open Inflation:**

Inflation is open when markets for goods or factors of production are allowed to function freely, setting prices of goods and factors without normal interference by the authorities. Thus open inflation is the result of the uninterrupted operation of the market mechanism. There are no checks or controls on the distribution of commodities by the government. An increase in demand and shortage of supplies persist which tend to lead to open inflation. Unchecked open inflation ultimately leads to hyperinflation.

- **Suppressed Inflation:**

When the government imposes physical and monetary controls to check open inflation, it is known as repressed or suppressed inflation. The market mechanism is not allowed to function normally by the use of licensing, price controls, and rationing to suppress the extensive rise in prices.

So long as such controls exist, the present demand is postponed and there is the diversion of demand from controlled to uncontrolled commodities. But as soon as these controls are removed, there is open inflation. Moreover, suppressed inflation adversely affects the economy.

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When the distribution of commodities is controlled, the prices of uncontrolled commodities rise very high. Suppressed inflation reduces the incentive to work because people do not get the commodities that they want to have. Controlled distribution of goods also leads to mal-allocation of resources. This results in the diversion of productive resources from essential to non-essential industries. Lastly, suppressed inflation leads to black marketing, corruption, hoarding, and profiteering.

- **Mark-up Inflation:**

The concept of mark-up inflation is closely related to the price-push problem. Modern labour organisations possess substantial monopoly power. They, therefore, set prices and wages based on mark-up over costs and relative incomes. Firms possessing monopoly power have control over the prices charged by them. So they have administered prices that increase their profit margin. This sets off an inflationary rise in prices. Similarly, when strong trade unions are successful in raising the wages of workers, this contributes to inflation.

- **Ratchet Inflation:**

A ratchet is a toothed wheel provided with a catch that prevents the ratchet wheel from moving backward. The same is the case under ratchet inflation when despite downward pressures in the economy, prices do not fall. In an economy having a price, wage, and cost inflations, aggregate demand falls below full employment level due to the deficiency of demand in some sectors of the economy.

But wage, cost and price structures are inflexible downward because large business firms and labour organisations possess monopoly power. Consequently, the fall in demand may not lower prices significantly. In such a situation, prices will have an upward ratchet effect, and this is known as –ratchet inflation. ||

3.8 CAUSES OF INFLATION

The main causes of inflation in India are as follows:

- i) **Increase in Money Supply:** Inflation is caused by an increase in the supply of money which leads to an increase in aggregate demand. The higher the growth rate of the nominal money supply, the higher is the rate of inflation.
- ii) **Increase in Disposable Income:** When the disposable income of the people increases, it raises their demand for goods and services. Disposable income may increase with the rise in national income or reduction in taxes or reduction in the saving of the people.
- iii) **Increase in Public Expenditure:** Government activities have been expanding due to developmental activities and social welfare programs. This is also a cause for price rise.
- iv) **Increase in Consumer Spending:** The demand for goods and services increases when they are given credit to buy goods on a hire-purchase and installment basis.
- v) **Cheap Money Policy:** Cheap money policy or the policy of credit expansion

also leads to an increase in the money supply which raises the demand for goods and services in the economy.

- vi) Deficit Financing:** To meet its mounting expenses, the government resorts to deficit financing by borrowing from the public and even by printing more notes. This raises aggregate demand about aggregate supply, thereby leading to an inflationary rise in prices.
- vii) Black Assets, Activities, and Money:** The existence of black money and black assets due to corruption, tax evasion, etc., increase the aggregate demand. People spend a lot of money, lavishly. Black marketing and hoarding reduce the supply of goods. These trends tend to raise the price level further.
- viii) Repayment of Public Debt:** Whenever the government repays its past internal debt to the public, it leads to an increase in the money supply with the public. This tends to raise the aggregate demand for goods and services.
- ix) Increase in Exports:** When exports are encouraged, the domestic supply of goods declines. So prices rise.

Inflation is mainly caused by excess demand/ or decline in aggregate supply or output. Former leads to a rightward shift of the aggregate demand curve while the latter causes the aggregate supply curve to shift leftward. The former is called demand-pull inflation (DPI), and the latter is called cost-push inflation (CPI). Before describing the factors that lead to a rise in aggregate demand and a decline in aggregate supply we like to explain the "demand-pull" and "cost-push" theories of inflation.

3.8.1 Demand-Pull Inflation Theory:

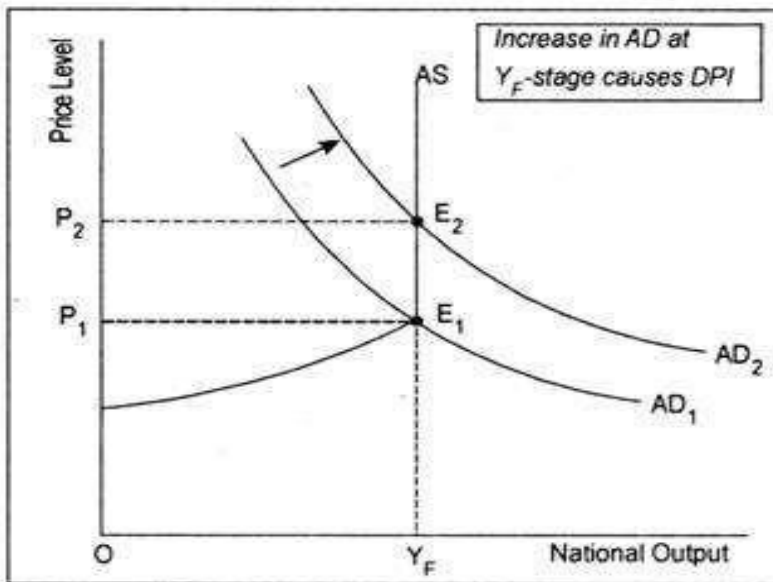
There are two theoretical approaches to the DPI—one is classical and the other is Keynesian.

According to classical economists or monetarists, inflation is caused by an increase in money supply which leads to a rightward shift in the negative sloping aggregate demand curve. Given a situation of full employment, classicists maintained that a change in money supply brings about an equi-proportionate change in the price level.

That is why monetarists argue that inflation is always and everywhere a monetary phenomenon. Keynesians do not find any link between money supply and price level causing an upward shift in aggregate demand.

According to Keynesians, aggregate demand may rise due to a rise in consumer demand or investment demand or government expenditure or net exports, or the combination of these four components of aggregate demand. Given full employment, such an increase in aggregate demand leads to upward pressure on prices. Such a situation is called DPI. This can be explained graphically.

Figure 4



Just like the price of a commodity, the level of prices is determined by the interaction of aggregate demand and aggregate supply. In Fig. 4, the aggregate demand curve is negative sloping while the aggregate supply curve before the full employment stage is positive sloping and becomes vertical after the full employment stage is reached. AD_1 is the initial aggregate demand curve that intersects the aggregate supply curve AS at point E_1 .

The price level, thus, determined is OP_1 . As the aggregate demand curve shifts to AD_2 , the price level rises to OP_2 . Thus, an increase in aggregate demand at the full employment stage leads to an increase in price level only, rather than the level of output. However, how much price level will rise following an increase in aggregate demand depends on the slope of the AS curve.

(ii) Causes of Demand-Pull Inflation:

DPI originates in the monetary sector. Monetarists' argument that "only money matters" is based on the assumption that at or near full employment excessive money supply will increase aggregate demand and will, thus, cause inflation.

An increase in the nominal money supply shifts the aggregate demand curve rightward. This enables people to hold excess cash balances. Spending on excess cash balances causes the price level to rise. The price level will continue to rise until aggregate demand equals aggregate supply.

Keynesians argue that inflation originates in the non-monetary sector or the real sector. Aggregate demand may rise if there is an increase in consumption expenditure following a tax cut. There may be an autonomous increase in business investment or government expenditure. Government expenditure is

inflationary if the needed money is procured by the government by printing additional money.

In brief, an increase in aggregate demand i.e., an increase in $(C + I + G + X - M)$ causes the price level to rise. However, aggregate demand may rise following an increase in money supply generated by the printing of additional money (classical argument) which drives prices upward. Thus, money plays a vital role. That is why Milton Friedman argues that inflation is always and everywhere a monetary phenomenon.

Other reasons may push aggregate demand and, hence, price level upwards. For instance, the growth of the population stimulates aggregate demand. Higher export earnings increase the purchasing power of the exporting countries. Additional purchasing power means additional aggregate demand. Purchasing power and, hence, aggregate demand may also go up if government repays the public debt.

Again, there is a tendency on the part of the holders of black money to spend more on conspicuous consumption goods. Such tendency fuels the inflationary fire. Thus, DPI is caused by a variety of factors.

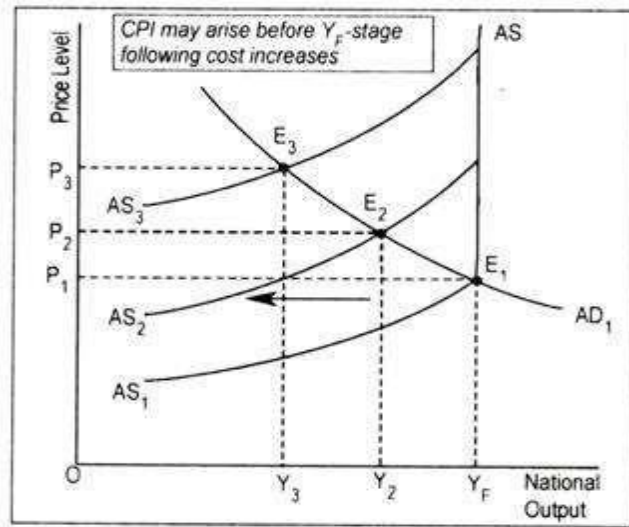
3.8.2 Cost-Push Inflation Theory:

In addition to aggregate demand, aggregate supply also generates an inflationary process. As inflation is caused by a leftward shift of the aggregate supply, we call it CPI. CPI is usually associated with non-monetary factors. CPI arises due to the increase in the cost of production. The cost of production may rise due to a rise in the cost of raw materials or an increase in wages.

However, wage increases may lead to an increase in the productivity of workers. If this happens, then the AS curve will shift to the rightward not leftward—direction. We assume here that productivity does not change despite an increase in wages.

Such increases in costs are passed on to consumers by firms by raising the prices of the products. Rising wages lead to rising costs. Rising costs lead to rising prices. And, rising prices again prompt trade unions to demand higher wages. Thus, an inflationary wage-price spiral starts. This causes the aggregate supply curve to shift leftward.

Figure 5



This can be demonstrated graphically where AS_1 is the initial aggregate supply curve. Below the full employment stage this AS curve is positive sloping and at the full employment stage, it becomes perfectly inelastic.

Intersection point (E_1) of AD_1 and AS_1 curves determine the price level (OP_1). Now there is a leftward shift of the aggregate supply curve to AS_2 . With no change in aggregate demand, this causes the price level to rise to OP_2 and output to fall to OY_2 . With the reduction in output, employment in the economy declines or unemployment rises. A further shift in AS curve to AS_3 results in a higher price level (OP_3) and a lower volume of aggregate output (OY_3). Thus, CPI may arise even below the full employment (Y_F) stage.

(iv) Causes of Cost-Push Inflation:

It is the cost factors that pull the prices upward. One of the important causes of price rise is the rise in the price of raw materials. For instance, by administrative order, the government may hike the price of petrol or diesel or freight rate. Firms buy these inputs now at a higher price. This leads to upward pressure on the cost of production.

Not only this, CPI is often imported from outside the economy. An increase in the price of petrol by OPEC compels the government to increase the price of petrol and diesel. These two important raw materials are needed by every sector, especially the transport sector. As a result, transport costs go up resulting in a higher general price level.

Again, CPI may be induced by wage-push inflation or profit-push inflation. Trade unions demand higher money wages as compensation against inflationary price rise. If the increase in money wages exceeds labour productivity, aggregate

supply will shift upward and leftward. Firms often exercise power by pushing prices up independently of consumer demand to expand their profit margins.

Fiscal policy changes, such as an increase in tax rates also lead to upward pressure on the cost of production. For instance, an overall increase in excise tax of mass consumption goods is inflationary. That is why the government is then accused of causing inflation.

Finally, production setbacks may result in decreases in output. Natural disasters, gradual exhaustion of natural resources, work stoppages, electric power cuts, etc., may cause aggregate output to decline. During this output reduction, the artificial scarcity of any goods created by traders and hoarders just simply ignite the situation.

Inefficiency, corruption, mismanagement of the economy may also be the other reasons. Thus, inflation is caused by the interplay of various factors. A particular factor cannot be held responsible for any inflationary price rise.

3.9 EFFECTS OF INFLATION

The effects of inflation can be classified into two heads:

- (1) Effects on Production and
- (2) Effects on Distribution.

1. Effects on Production:

When inflation is very moderate, it acts as an incentive to traders and producers. This is particularly before full employment when resources are not fully utilized. The profit due to rising prices encourages and induces business class to increase their investments in production, leading to the generation of employment and income.

- i) However, hyper-inflation results in a serious depreciation of the value of money and it discourages savings on the part of the public.
- ii) When the value of money undergoes considerable depreciation, this may even drain out the foreign capital already invested in the country.
- iii) With reduced capital accumulation, the investment will suffer a serious setback which may harm the volume of production in the country. This may discourage entrepreneurs and businessmen from taking business risks.
- iv) Inflation also leads to hoarding of essential goods both by the traders as well as the consumers and thus leading to a still higher inflation rate.
- v) Inflation encourages investment in speculative activities rather than productive purposes.

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2. Effects on Distribution

- i) **Debtors and Creditors:** During inflation, debtors are the gainers while the creditors are the losers. The reason is that the debtors had borrowed when the purchasing power of money was high and now repay the loans when the purchasing power of money is low due to rising prices.
- ii) **Fixed-income Groups:** The fixed income groups are the worst hit during inflation because their incomes being fixed do not bear any relationship with the rising cost of living. Examples are wage, salary, pension, interest, rent, etc.
- iii) **Entrepreneurs:** Inflation is a boon to the entrepreneurs whether they are manufacturers, traders, merchants, or businessmen because it serves as a tonic for business enterprise. They experience windfall gains as the prices of their inventories (stocks) suddenly go up.
- iv) **Investors:** The investors, who generally invest in fixed interest yielding bonds and securities have much to lose during inflation. On the contrary, those who invest in shares stand to gain rich dividends and appreciation in the value of shares.

3.10 REMEDIAL MEASURES TO CONTROL INFLATION

1. Monetary Measures:

(a) Credit Control:

- One of the important monetary measures is monetary policy. The central bank of the country adopts several methods to control the quantity and quality of credit. For this purpose, it raises the bank rates, sells securities in the open market, raises the reserved ratio, and adopts many selective credit control measures, such as raising margin requirements and regulating consumer credit.
- Monetary policy may not be effective in controlling inflation if inflation is due to cost-push factors. Monetary policy can only help control inflation due to demand-pull factors.

(b) Demonetisation of Currency:

- However, one of the monetary measures is to demonetize currency of higher denominations. Such a measure is usually adopted when black money is abundant in the country.

(c) Issue of New Currency:

- The most extreme monetary measure is the issue of new currency in place of the old currency. Under this system, one new note is exchanged for some notes of the old currency. The value of bank deposits is also fixed accordingly. Such a measure is adopted when there is an excessive issue of notes and there is hyperinflation in the country. It is a very effective measure. But is inequitable for it hurts the small depositors the most.

2. Fiscal Measures:

- Monetary policy alone is incapable of controlling inflation. It should, therefore, be supplemented by fiscal measures. Fiscal measures are highly effective for controlling government expenditure, personal consumption expenditure, and private and public investment.

(a) Reduction in Unnecessary Expenditure:

- The government should reduce unnecessary expenditure on non-development activities to curb inflation. This will also put a check on private expenditure which is dependent upon government demand for goods and services. But it is not easy to cut government expenditure. Though economic measures are always welcome it becomes difficult to distinguish between essential and non-essential expenditure. Therefore, this measure should be supplemented by taxation.

(b) Increase in Taxes:

- To cut personal consumption expenditure, the rates of personal, corporate and commodity taxes should be raised and even new taxes should be levied, but the rates of taxes should not be so high as to discourage saving, investment and production. Rather, the tax system should provide larger incentives to those who save, invest and produce more.
- Further, to bring more revenue into the tax net, the government should penalize the tax evaders by imposing heavy fines. Such measures are bound to be effective in controlling inflation. To increase the supply of goods within the country, the government should reduce import duties and increase export duties.

(c) Increase in Savings:

- Another measure is to increase savings on the part of the people. This will tend to reduce disposable income with the people, and hence personal consumption expenditure. But due to the rising cost of living, people are not in a position to save much voluntarily. Keynes, therefore, advocated compulsory savings or what he called deferred payment where the saver gets his money back after some years.
- For this purpose, the government should float public loans carrying high rates of interest, start saving schemes with prize money, or lottery for long periods, etc. It should also introduce compulsory provident fund, provident fund-cum-pension schemes, etc. compulsorily. All such measures to increase savings are likely to be effective in controlling inflation.

(d) Surplus Budgets:

- An important measure is to adopt the anti-inflationary budgetary policy. For

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this purpose, the government should give up deficit financing and instead have surplus budgets. It means collecting more in revenues and spending less.

(e) Public Debt:

- At the same time, it should stop repayment of public debt and postpone it to some future date till inflationary pressures are controlled within the economy. Instead, the government should borrow more to reduce the money supply with the public.
- Like monetary measures, fiscal measures alone cannot help in controlling inflation. They should be supplemented by monetary, non-monetary, and non-fiscal measures.

3.11 STAGFLATION

Stagflation is an economic event in which the inflation rate is high, the economic growth rate slows, and unemployment remains steadily high. Such an unfavorable combination is feared and can be a dilemma for governments since most actions designed to lower inflation may raise unemployment levels, and policies designed to decrease unemployment may worsen inflation.

• Causes of Stagflation

There is no consensus among economists on the causes of stagflation. Each economics school offers its view on its origins. However, two main theories may be derived: supply shock and pooreconomic policies.

The supply shock theory suggests that stagflation occurs when an economy faces a sudden increase or decrease in the supply of a commodity or service (supply shock), such as a rapid increase in the price of oil. In such a situation, prices surge, making production costlier and less profitable, thus slowing economic growth.

A second theory states that stagflation can be a result of a poorly made economic policy. For example, the government can create a policy that harms industries while growing the money supply too quickly. The simultaneous occurrence of these policies can lead to slower economic growth and higher inflation.

• Example of Stagflation

Stagflation is costly and difficult to eliminate, both in social and fiscal terms. There are only a few examples in history. The most notable one occurred in the 1970s in the United States.

The onset of stagflation In the 1970s was blamed on the US Federal Reserve's unsustainable economic policy during the boom years of the late 1950s and 1960s. The Fed moved to keep unemployment low and boost overall demand for

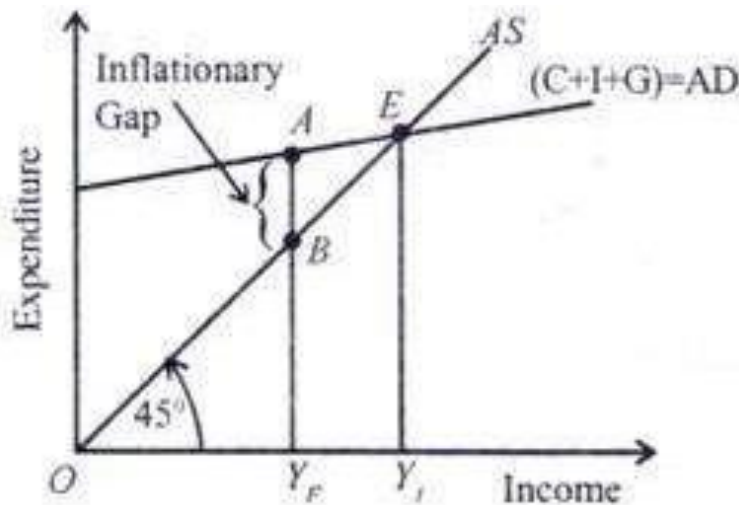
products and services in the 1960s. However, the unnaturally low unemployment during the decade triggered something called a wage-price spiral.

The OPEC oil embargo in 1973 also contributed to the unwanted economic event in the US. Industries across the country suffered from excessively high oil prices and shortages. Demand fell to new lows, and industrial output suffered.

3.12 THE INFLATIONARY GAP

- In his pamphlet *How to pay for the War* published in 1940, Keynes explained the concept of the inflationary gap. He defined an inflationary gap as an excess of planned expenditure over the available output at pre-inflation or base prices. According to Lipsey, "The inflationary gap is the amount by which aggregate expenditure would exceed aggregate output at the full employment level of income." The classical economists explained inflation as mainly due to an increase in the quantity of money, given the level of full employment.
- Keynes, on the other hand, ascribed it to the excess of expenditure over income at the full employment level. The larger the aggregate expenditure, the larger the gap and the more rapid the inflation. Given a constant average propensity to save, rising money incomes at full employment level would lead to an excess of demand oversupply and a consequent inflationary gap. Thus Keynes used the concept of the inflationary gap to show the main determinants that cause an inflationary rise in prices.

Figure 6



The inflationary gap is shown diagrammatically in Figure 6 where OY_F is the full employment level of income, 45° line represents aggregate supply AS and $C + I + G$ line the desired level of consumption, investment and government expenditure (or aggregate demand curve). The economy's aggregate demand curve $(C + I + G) = AD$ intersects the 45° line (AS) at point E at the income level OY_1 which is greater than the full employment income level OY_F . The amount by

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which aggregate demand (Y_{FA}) exceeds the aggregate supply (Y_{FB}) at the full employment income level is the inflationary gap.

This is AB in the figure. The excess volume of total spending when resources are fully employed creates inflationary pressures. Thus the inflationary gap leads to inflationary pressures in the economy which are the result of excess aggregate demand.

3.13 DEFLATION

- Deflation is the opposite of inflation. Just as inflation is a phenomenon of rising prices, deflation is a phenomenon of falling prices. In the words of Crowther, "Deflation is that state of the economy where the value of money is rising or the prices are falling." No doubt deflation is associated with falling prices, but it is not that every fall in price will be termed as deflation.
- Only those falls in prices which result in unemployment, overproduction and fall in the economic activity are deflationary. In short, deflation is a situation in which falling prices are accompanied by falling levels of employment, output and income.

3.13.1 Causes of Deflation

- Deflation is a situation in which falling prices are accompanied by falling levels of employment, income and output. Deflation may be due to certain natural causes, or it may be due to a deliberate policy of the government.

(i) Deficient Aggregate Demand:

- The main reason for deflation is the deficiency of aggregate demand which leads to over- production and unemployment. Aggregate demand consists of aggregate consumption expenditure and aggregate investment expenditure.

(ii) Less Investment Expenditure:

- Private investment is governed by marginal efficiency of capital (MEC) and rate of interest. Deflation is the result of the decline in investment which is due to (a) low MEC or low profitability of capital and (b) high rate of interest.

iii) Fall in MEC:

- As the process of economic expansion goes on, certain forces come into operation which exerts downward pressures on MEC.

These forces are:

- (a) During the process of expansion costs of production start rising on account of the increasing scarcities of materials and equipment. Wage cost also rises because of the scarcity of labour. Rising costs have a depressing effect on MEC.

(b) Increasing abundance of output resulting from industrial expansion leads to lessening the returns below expectations which also depresses MEC.

(iv) Less Consumption:

- The basic cause of deflation or depression lies in Keynes' concept of consumption function or his psychological law of consumption. According to this law, the consumers do not spend the whole of the increment of their incomes on consumer goods.
- As the income increases, the community spends a smaller proportion of its increased income on consumer goods. The reduced sale of consumer goods leads to the accumulation of a stock of consumer goods (or overproduction). This also harms business expectations and MEC.

(v) Rise in Rate of Interest:

- The fall in the MEC is followed by a rise in demand for money or a rise in liquidity preference (i.e., the tendency of the people to keep money in cash form). No one likes to purchase goods or securities when the prices are falling. Given the supply of money, an increase in liquidity preference results in the rise in the rate of interest which also reduces investment.
- To sum up, according to Keynes, the rising rate of interest, declining MEC, the falling tendency of consumption- all these factors lead to reduce aggregate demand which ultimately results in deflationary conditions in the economy.

Contractionary Monetary Policy:

- When the government adopts a contractionary monetary policy, it makes the availability of credit more costly by raising the rate of interest and reducing the supply of money. This results in a fall in prices. Various contractionary monetary measures are- raising the bank rate, sale of government securities, raising the cash reserve ratio, reducing the currency, etc.

Reduction in Government Expenditure:

- If the government decides to reduce public expenditure, it will reduce national income and employment multiple times (through the adverse working of multiplier). This will reduce aggregate demand, discourage investment and affect the economic activity of the economy adversely.

Heavy Taxes:

- Heavy taxes imposed by the government reduce the disposable income of the people. This leads to the decline in both consumption and investment expenditure and results in deflationary conditions.

Increasing Economic Inequalities:

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- Increasing inequalities of income and wealth make the rich richer and the poor poorer. Since the marginal propensity to consume (MPC) of the rich is less than that of the poor, growing inequalities of income will reduce consumption expenditure and will lead to a deflationary situation.

Public Borrowing:

- When the government borrows from the public, it results in the transfer of money from the public to the government. This reduces aggregate demand and brings deflation to the economy.

Psychological Factors:

- Some economists feel that deflation and depression are the results of waves of optimism and pessimism. During the optimistic conditions of the boom, they make an over-investment. As a consequence, they fail to find buyers for their products, suffer losses, grow pessimistic about the prospects of the business and curtail their productive activities. Thus, the discovery of the error of optimism gives birth to the opposite error of pessimism.

Other Factors:

- Some other non-economic and non-monetary factors, such as wars, earthquakes, strikes, crop failures, etc. may also cause deflationary conditions.

3.13.2 Effects of deflation on the economy

1. Producers: Deflation adversely affects the producers:

- a) During deflation, production costs do not fall as rapidly as the prices of finished goods,
- b) When the producer buys raw material and other inputs, he pays a higher price, but by the time he reached the market to sell his finished products, the prices of raw materials will fall because of deflation. Thus the producer will be forced to sell his products at a lower price.
- c) The demand for commodities goes on falling due to deflation.

As a result of this, the profits of the producer will fall and there will be an overproduction of the commodities. Similarly, deflation also adversely affects the farmers, particularly the small farmers.

2. Traders:

- The traders are also adversely affected during deflation. When they make purchases, they have to pay higher prices, but when they sell the products prices fall due to deflationary trend. As a result, the traders are likely to lose.

3. Investors: Different types of investors are affected differently due to deflation:

- (a) The fixed-income investors (like debenture and bondholders) gain by deflation because incomes remain constant while the prices fall.
- (b) The variable income investors (like equity holders) will lose during the depression because their incomes fall with the falling prices.

4. Salaried and Labour Classes:

- Wage-earners and salaried persons gain during deflation. The reason is that with the fall in prices, the wages and salaries cannot be reduced; such attempts will be strongly opposed by the trade unions

❖ **Consumers:**

- Consumers generally gain due to falling prices because the purchasing power of their money rises.

❖ **Consumers are of two types:**

- (a) The consumers whose income remains fixed (i.e., salaried persons) will be benefited from deflation.
- (b) The consumers whose income falls during deflation (e.g., profit earners) may lose during deflation.

6. Creditors and Debtors:

- During deflation, the prices fall and the value of money rises. As a result, the creditors tend to gain and the debtors tend to lose

❖ **Other Effects on the Economy**

Deflation also affects the general life of the economy in the following way:

- i. Tax-payers are adversely affected in the deflationary period because due to falling prices, the value of money rises, and the real burden of taxation increases.
- ii. The government faces an increase in the real burden of public debt.
- iii. Due to falling prices and profits, the entrepreneurs reduce output. Some small businesses may close down. This results in the unemployment of workers and employees.
- iv. Banking business also suffers during deflation because the number of borrowers falls sharply due to general recession in the economy.
- v. Like the private sector units, the public sector enterprises also suffer losses during deflation when the prices fall.
- vi. Deflationary conditions lead to a greater number of industrial disputes and thus create industrial unrest in the economy.
- vii. During deflation, the pace of economic growth slows down or even

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suffers a setback and the economic, social and political life of the country gets disturbed.

In short, deflation is even worse than inflation. Middle-class people gain at the expense of the richer classes. Reduction in output and widespread unemployment adversely affect the economic life of the country and lead to social unrest.

3.13.3 Remedial Measures to Control of Deflation:

1. Reduction in Taxation:

- The government should reduce the number and burden of various taxes levied on commodities. This will increase the purchasing power of the people. As a result, the demand for goods and services will increase. Moreover, sufficient tax relief should be given to businessmen to encourage investment.

2. Redistribution of Income:

- Marginal propensity to consume can be raised by a redistribution of income and wealth from the rich to the poor. Since the marginal propensity to consume of the poor is high and that of the rich is low, such a measure will help to increase the aggregate demand in the economy.

3. Repayment of Public Debt:

- During the deflation period, the government can repay the old public debts. This will increase the purchasing power of the people and push up effective demand.

4. Subsidies:

- The government should give subsidies to induce the businessmen to increase investment.

5. Public Works Programme:

- The government should also directly undertake public works program and thus increase expenditure in the public sector. Care should, however, be taken that the public works policy of the government does not adversely affect investment in the private sector; it should supplement, and not supplant, private investment.
- For this, only those projects must be selected for the government's public works policies which are either too big or not so profitable to attract private investment.

6. Deficit Financing:

- To have significant expansionary effects, the government's public works

schemes should be financed by the method of deficit financing, i.e., by printing new money. The government should adopt a budgetary deficit (excess of government expenditure over its revenue) and cover this deficit through deficit financing.

- Deficit financing makes available to the government sufficient resources for its developmental programs without adversely affecting investment in the private sector.

7. Reduction in Interest Rate:

- By adopting a cheap money policy, the monetary authority of a country reduces the interest rate which stimulates investment and thereby expands economic activity in the economy.

8. Credit Expansion:

- The central bank and the commercial banks should adopt a policy of credit expansion to promote business and industry in the country. Bank credit should be made easily available to entrepreneurs for productive purposes.

9. Foreign Trade Policy:

- To control deflation, the government should adopt such a foreign trade policy that, on the one hand, increases exports, and, on the other hand, reduces imports. This kind of policy will go a long way in solving the problem of overproduction and help to overcome deflation.

10. Regulation of Production:

- Production in the economy should be regulated in such a way that the problem of over- production does not arise. Attempts should be made to adjust production with the existing demand to avoid over-production.

In short, fiscal policy alone or monetary policy alone is not sufficient to check deflation in an economy. Proper coordination of fiscal, monetary and other measures is essential to effectively deal with the deflationary situation.

3.14 Difference between inflation and deflation

BASIS FOR COMPARISON	INFLATION	DEFLATION
Meaning	When the value of money decreases in the international market, then this situation is termed inflation.	Deflation is a situation when the value of money increases in the international market.

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Effects	Increase in the general price level	Decrease in the general price level
National income	Does not declines	Declines
Gold prices	Falls	Rises
Classification	Demand-pull inflation, cost-pushinflation, stagflation and deflation.	Debt deflation, money supply-side deflation, credit deflation.
Good for	Producers	Consumers
Consequences	Unequal distribution of income.	The rise in the level of unemployment
Which is evil?	A little bit of inflation is a symbol of the economic growth of the country.	Deflation is not good for an economy

❖ CHECK YOUR PROGRESS

1. Long Questions

2. Define inflation and discuss the types of inflation.
3. Examine the causes and effects of inflation in economy.
4. What is demand pull inflation?
5. Explain meaning, causes and effects of deflation.
6. Explain inflationary gap with diagram.
7. What is cost push inflation?
8. What do you mean by stagflation?
9. Explain the difference between inflation and deflation.
10. Explain causes and types of business cycle.
11. Define the meaning, phases and nature of business cycle.

2. Short Questions

1. What does semi inflation mean?
2. What do you mean by suppressed inflation?
3. What are the causes of deflation?
4. What do you mean by true inflation?
5. Give the meaning of stagflation.
6. What is the meaning of ratchet effect?
7. What do you mean by cost push inflation?
8. What does markup inflation mean?
9. What does open mean?
10. What does deflation mean?
11. What does partial inflation mean?
12. What does inflation mean?

3. Multiple Choice Questions

- 1) An economic variable that moves in the same direction as aggregate economic activity (up in expansions, down in contractions) is called**
 - a) Pro-cyclical.
 - b) Counter-cyclical.
 - c) A-cyclical.
 - d) A leading variable
 - e)

- 2) One of the first organizations to investigate the business cycle was**
 - a) The Federal Reserve System.
 - b) The National Bureau of Economic Research.
 - c) The Council of Economic Advisors.
 - d) The Brookings Institution.

- 3) The trough of a business cycle occurs when ____ hits its lowest point.**
 - a) Inflation
 - b) The money supply
 - c) Aggregate economic activity
 - d) The unemployment rate

- 4) The low point in the business cycle is referred to as the**
 - a) expansion.
 - b) boom.
 - c) trough.
 - d) peak.

- 5) When aggregate economic activity is increasing, the economy is said to be in**
 - a) an expansion.
 - b) a contraction.
 - c) a peak.
 - d) a turning point.

- 6) When aggregate economic activity is declining, the economy is said to be in**
 - a) a contraction.
 - b) an expansion.
 - c) a trough.
 - d) a turning point.

- 7) Peaks and troughs of the business cycle are known collectively as**
 - a) volatility.
 - b) turning points.
 - c) equilibrium points.
 - d) real business cycle events.

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- 8) Research on the effects of recessions on the real level of GDP shows that**
- a) Recessions cause only temporary reductions in real GDP, which are offset by growth during the expansion phase.
 - b) Recessions cause large, permanent reductions in the real level of GDP.
 - c) Recessions cause both temporary and permanent declines in real GDP, but most of the decline is temporary.
 - d) Recessions cause both temporary and permanent declines in real GDP, but most of the decline is permanent.
- 9) The longest economic expansion in the United States occurred during the**
- a) 1940s.
 - b) 1960s.
 - c) 1980s.
 - d) 1990s.
- 10) The horizontal segment of the aggregate supply curve suggests that ample resources are available to increase real GDP without causing__.**
- a) Inflation
 - b) Deflation
 - c) Disinflation
 - d) None of above
- 11) The most inclusive measure of inflation is the GDP_____.**
- a) Deflator
 - b) Inflator
 - c) Dis-inflator
 - d) None of above
- 12) In order for a recession to exist,_____in the nation's real GDP must persist for at least half a year.**
- a) Decline
 - b) Increase
 - c) Neutral
 - d) Stable
- 13) Stagflation is a period of stagnating or falling_____GDP, inflation, and relatively high unemployment.**
- a) nominal
 - b) real
 - c) Current
 - d) None of above
- 14) During a recovery, real GDP increases and unemployment_____.**
- a) Declines
 - b) Increases
 - c) Remains Neutral

- d) Remains Stable
- 15) **The _____ sloping portion of the aggregate supply curve suggests that an increase in the price level will be associated with an increase in real GDP.**
- a) Upward
 - b) Downward
 - c) Vertical
 - d) Horizontal
- 16) **Demand-pull inflation occurs when increases in aggregate demand shift the aggregate demand curve to the right while the aggregate supply curve remains unchanged at full-employment real GDP.**
- a) Left
 - b) Right
 - c) Parallel
 - d) None of above
- 17) **The upward slope of the trend line through a business cycle indicates that**
- a) the economy is in a recovery phase
 - b) the economy is in a period of stagflation
 - c) there is a positive relationship between real GDP and the price level
 - d) the economy's output increases in the long run
- 18) **One characteristic of the recovery phase of the business cycle is that**
- a) upward pressure on the economy's price level begins to build
 - b) output reaches its maximum level
 - c) a recession will soon follow
 - d) inflation is moderating
- 19) **All of the following conditions are consistent with general prosperity in the economy except**
- a) unemployment is relatively low
 - b) wage rates are relatively high
 - c) real GDP is relatively high
 - d) the price level decreases
- 20) **It is important to control for price increases when comparing GDP between two years because**
- a) nominal GDP can rise due to either an increase in output or an increase in the price level
 - b) economists are only interested in price changes
 - c) price increases are usually larger in relative terms than quantity increases
 - d) price increases can reduce nominal GDP

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- 21) Demand-pull inflation is the result of**
- a) a leftward shift in the aggregate supply curve
 - b) a rightward shift in the aggregate supply curve
 - c) an increase in taxes
 - d) a rightward shift in the aggregate demand curve
- 22) Cost-push inflation refers to an increase in the price level due to**
- a) an increase in aggregate expenditures
 - b) rising government spending due to national emergencies like war or depression
 - c) a shift to the right in the aggregate supply curve
 - d) rising costs of critical inputs such as energy, labour, and capital
- 23) Stagflation poses a dilemma for policymakers because**
- a) if aggregate demand is reduced to combat inflation, equilibrium GDP will tend to rise.
 - b) if aggregate demand is increased to combat unemployment, the price level will tend to fall.
 - c) if aggregate demand is stimulated to expand the economy, the price level will tend to rise.
 - d) any reduction in aggregate demand will tend to lower both the price level and the unemployment rate.

MCQ Answer

1	2	3	4	5	6	7	8	9	10
a	b	c	c	a	a	b	c	d	a
11	12	13	14	15	16	17	18	19	20
a	a	b	a	a	b	d	a	d	a
21	22	23							
d	d	c							

4.1 MEANING AND DEFINITION**4.2 INDIVIDUAL DEMAND AND MARKET DEMAND (WITH SCHEDULES AND CURVES)****4.3 REASONS FOR DOWNWARD SLOPING DEMAND CURVE****4.4 DETERMINANTS OF DEMAND****4.5 THE LAW OF DEMAND****4.5.1 ASSUMPTIONS****4.5.2 DEMAND FUNCTION****4.5.3 EXCEPTIONS TO THE LAW OF DEMAND****4.6 ELASTICITY OF DEMAND****4.6.1 PRICE****4.6.2 CROSS****4.6.3 INCOME****4.7 TYPES OF DEMAND****4.8 DEMAND FORECASTING****4.8.1 MEANING AND SIGNIFICANCE****4.8.2 METHODS OF DEMAND FORECASTING****4.8.3 CRITERIA OF A GOOD DEMAND FORECASTING****❖ CHECK YOUR PROGRESS**

4.1 MEANING AND DEFINITION

Suppose Miss Bina has a strong desire to purchase a luxury car with the price of 40 Lacs on coming Diwali Festival. Can it be called demand? Obviously not! She would require enough money i.e., purchasing power to buy that luxury car. Suppose she can manage for Rs. 40 lacs. Now, can desire plus purchasing power be called demand? Quite not! What if she has some other priority (willingness to buy) like owning a house than to have a car?! Can desire plus purchasing power plus willingness to pay for car be called demand? Yes, but only in context to the same price and time during which she wanted to have a car. If the price increases to Rs. 42 lacs. She may refuse to buy the car. And if the dealer can't deliver the car before Diwali, she may refuse to buy the car. Thus, Demand Means Desire/want/need to purchase

- Ability/purchasing power
- Willingness to pay/preference

- Certain price
- Certain time period/frame

❖ Meaning

Demand is a want, ability and willing to purchase certain quantity/volume of goods/services at certain price in a given time period.

Or

Demand is an economic principle referring to a consumer's desire to purchase goods and services and willingness to pay a price for a specific good or service.

4.2 INDIVIDUAL DEMAND AND MARKET DEMAND

Individual demand is the quantity demanded of commodity or service by one person at different prices.

The demand of all individuals in given market is known as market demand. In other words, Market demand is the total quantity demanded across all consumers in a market for a given good.

❖ Demand schedule

The demand schedule shows response of quantity demanded to change in price of that commodity. This is the table that shows prices per unit of commodity and amount demanded per period of time. There can be two types of demand schedule.

1. Individual Demand Schedule
2. Market Demand Schedule

The table showing quantity demanded by one person at different prices is called individual demand schedule.

The market demand schedule means 'quantities of given commodity which all consumers want to buy at all possible prices at a given moment of time'. The demand schedules of all individuals can be added up to find out market demand schedule. The experts are concerned with market demand schedule.

Suppose there are two individuals in one market. If we prepare separate demand schedule for customers A and B, it will be as follow

Individual Demand Schedule of Customer A

Price	Demand of A
1	25
2	20
3	15
4	10
5	5
6	0

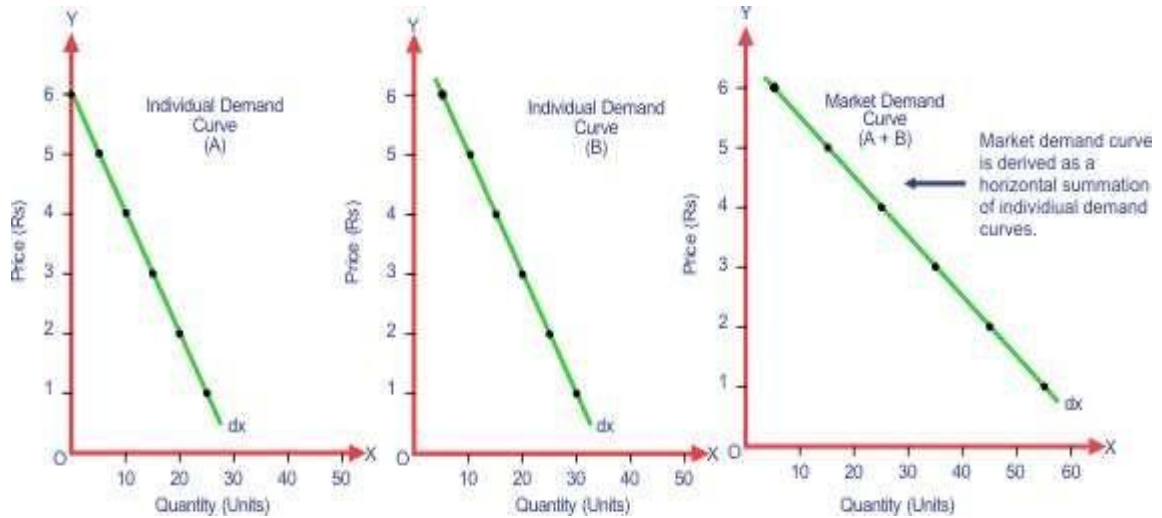
DEMAND ANALYSIS AND FORECASTING

The table shows the demand of all the consumers in a market. When the price increases there is decrease in demand for goods and vice versa. When price is Rs. 1 demand is 25 units. When the price is Rs. 2 demand is 20 units. Thus, the schedule shows the quantity demanded by single consumer at various price levels. Likewise

Market Demand Schedule

Price	Quantity Demanded by A	Quantity Demanded by B	Quantity Demanded by Market (A+B)
1	25	30	55
2	20	25	45
3	15	20	35
4	10	15	25
5	5	10	15
6	0	5	5

The above market demand schedule (Figure 1.1, 1.2 and 1.3 from L to R)



It is seen that the figure 1.1 shows the quantity demanded by Customer A and figure 1.2 shows the quantity demanded by customer B. But figure 1.3 shows the total quantity demanded by market i.e., by customers A and B. All curves are downward sloping and shows the negative or inverse relationship between price and quantity demanded.

4.3 Reasons for Downward Sloping Demand Curve

Why the slope of demand curve is negative?

We observed that the demand curve falls as the price rises and it rises when the price falls. Why demand curve falls?

1. Law of Diminishing Marginal Utility or Utility Decreases:

When a consumer buys more units of a commodity, the marginal utility of such commodity continues to decline. The consumer can buy more units of commodity when its price falls and vice versa. The demand curve falls because demand is more at lower price.

2. Price effect: (PE=IE+SE)

When there is increase in price of commodity, the consumers reduce the consumption of such commodity. The result is that there is decrease in demand for that commodity. The consumers consume more or less of a commodity due to price effect. The demand curve slopes downward.

A. Income effect

Real income of consumer rises due to fall in prices. The consumer can buy more quantity of same commodity. When there is increase in price, real income of consumer falls. This is income effect that the consumer can spend increased income on other commodities. The demand curve slopes downward due to positive income effect. E.g., when Mr. Het wants to buy a t-shirt at Rs. 1000 but when he reaches to shop, he is told that there is 50% discount on that T-shirt price. He feels that someone has put extra 500 rupees in his pocket. So, will buy one more T-shirt as his purchasing power or real income as increased due to reduction in price. This is called income effect

B. Substitutes Effects

When the price of a commodity falls, the prices of substitutes remaining the same, consumer can buy more of the commodity and vice versa. The demand curve slopes downward due to substitution effect. E.g., Buttermilkwala and Yoghurtwala are the two competitors selling Shrikhand. If Buttermilkwala decreases the price of shrikhand, the customer will find its product cheaper than its substitute so, he will buy more Buttermilkwala product.

3. Demand of poor people

When price decreases, certain goods come into the reach of poor people, who earlier, were not able to buy that good.

4. Different uses of goods

There are different uses of many goods. When prices of such goods increase these goods are put into uses that are more important and their demand falls. The demand curve slopes downward due to such goods.

4.4 DETERMINANTS OF DEMAND

It is essential to understand the constituents/determinants/factors affecting demand. Following are the factors that affect demand.

Price of commodity or service: Usually the quantity demanded of commodity and price of commodity are inversely related. So, when price rises, quantity does fall in most of the cases.

Price of related commodity or service: There can be two types of related commodities; substitute and complementary. In the case of substitute goods, the price of substitute goods and the demand of concerned commodity are positively related. i.e., if price of Patanjali Products is increased, the demand of Himalaya products will go up. In the case of complementary goods, the price of complementary goods and the demand of concerned commodity are negatively related. i.e., if price of Petrol increases, the demand of Automobile products will decline.

Income of people: Usually, income of people and demand of normal and luxury goods are positively related. So, when individual or income of people increases, the demand of normal and luxury items goes up. However, in the case of inferior goods, the income and demand are inversely related.

Taste and preferences: If there are favorable change in the taste and preferences of people to commodity, the demand of that commodity will increase and vice versa. E.g., if people start loving healthy organic food instead of junk food, the demand for organic food will increase but the demand for junk food will decrease.

Fashion and trends: If people are driven by the fashion for certain goods, the demand of that commodity will increase but, if people consider certain goods outdated, the demand for that product will decrease. E.g., if people start loving Khadi Apparels instead of synthetic cloth, the demand for khadi will increase.

Weather conditions/environment: The changes in weather, seasons and climate also affect the demand for certain commodities. E.g., in winter the demand for woolen clothes is found on peak.

Future expectations about price: The future expectations about the price changes also affect demand. If consumers expect price of edible oil to decrease in future, they will postpone their purchase and so, the demand for that commodity will decrease for some time. Contrary, if the oil prices are likely to increase, the people may rush to market to purchase the edible oil so, the current demand will increase.

Population/Demographics: Generally, the large population means large demand but not in all the cases. Much depends upon the formation of population. If the number of senior citizens is more, the demand for spectacles and walking sticks will remain high. Contrary, if the share of children in population is large, the demand for toys and books will be high.

4.5 THE LAW OF DEMAND

In the first unit, we saw that economics is science as well as arts. As it is science, it has some laws, rules, principles. One of the most popular and widely applied Laws of economics is the Law of Demand.

The law of demand will prove correct good only if “Ceteris paribus” (other things remaining the same) condition are applied. Ceteris Paribus means “Other things remaining the same” which is also called the assumptions of the law of demand.

Most of the economists have a common view that demand and price are inversely correlated with each other. The quantity demanded increases with a fall in price and diminishes with the rise in price.

There is an inverse relationship between quantity demanded and its price. The people reduce demand when price of a commodity goes up so its demand comes down. When there is decrease in price the demand for a commodity goes up. There is negative relationship between price and demand.

❖ Definition

Alfred Marshal says that the amount demanded increase with a fall in price, diminishes with a rise in price.

C.E. Ferguson says that according to law of demand, the quantity demanded varies inversely with price.

Paul A. Samuelson says that law of demand states that people will buy more at a lower price and buy less at higher prices, other things remaining the same.

4.5.1 Assumption of the law of demand

- Psychological factors like habit, tastes, and preferences of the customers must remain unchanged.
- Consumer’s money income must be constant.
- The particular commodity in consideration must not be prestigious goods to the consumer
- There must not be any substitute for the commodity
- Prices of other goods remain the same.
- Expectation of future price changes should not be changed
- Quality of commodity must remain the same.

4.5.2 The Law of Demand and Demand Function

The demand function is a mathematical tool to present the law of demand. It shows the equational relationship between factors affecting demand and the quantity demanded. It is presented as below.

$$D=f(P, Pr, I, FTP, FE, P\dots n)$$

It is read as demand is the function of price(P), price of related commodities (Pr), Income(I), Fashion-Taste-Preference (FTP), Future Expectations about changes in Price (FE), Population(P)and other factors.

Here, we have to examine the relationship between quantity demanded and price only by keeping other factors constant so, the demand function will be written as

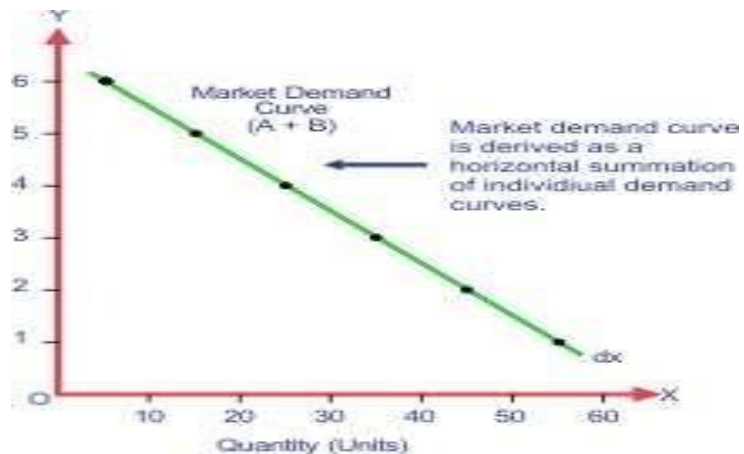
$$D=f(P)$$

Which means demand is the function of price only.

Explanation of the law

The law of demand can be explained with the help of schedule and curve.

Price	Demand of A
1	25
2	20
3	15
4	10
5	5
6	0

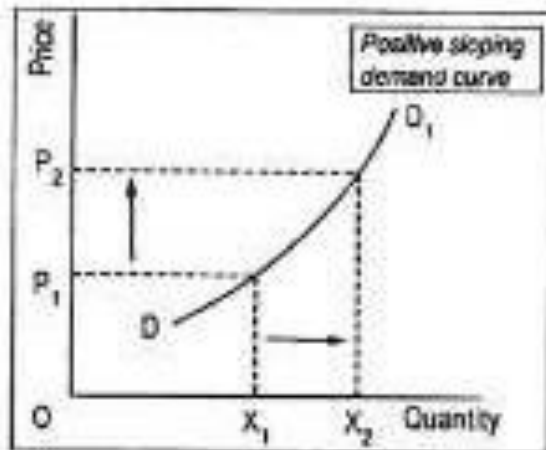


From the schedule and curve, it is seen that when price is rising, the quantity

demand of good is decreasing. There is same price in the market. All consumers purchase commodity according to their needs. The market demand curve is the total amount demanded by all consumers at different prices. The market demand curve slopes from left down to the right.

4.5.3 Exceptions to the law of demand

Well, economics is science but its social science. It belongs society and human nature which varies from person to person. So, the law of demand cannot be applied universally. There are some factors that proves the law of demand wrong.



They are called the exceptions to the law of demand.

In above Figure-1, D represents the demand curve in which OP1 is the price, and OX1 is the initial demand. When the price rises from OP1 to OP2, then the demand also rises from OX1 to OX2. This implies that if the price of a product increases its demand also increases, which constitutes an exception to law of demand.

❖ **Certain cases that are exceptions to the law of demand are as follow**

1. **Giffen Goods:** Sir Robert Giffen, classified goods into two types, inferior goods and superior goods, generally called Giffen goods. The inferior goods are those whose demand decreases with increase in consumer's income, such as cheap potatoes and vegetable ghee (hydrogenated vegetable oil). These goods are of low Quality; therefore, the demand for these goods decreases with increase in consumer's income. In addition, if the price of these goods increases, then the demand for these goods increases assuming that the high price good would be of good Quality for example, coffee is considered as superior and tea as inferior. In case the price of both of these goods increases the consumers would increase the demand of tea to satisfy their need by paying the same amount. In the factories of 18th century London, the workers used to eat breads and meat. When price of bread increased, they reduced eating meat but increased the demand of breads because even after an increase in the price of bread, it was the cheapest food option. So, people thought they can survive without meat but bread was the staple food. So, the demand for bread increased. Price of bread was \$1, the

workers were eating 10 breads a day. The price of 1 kg meat was already \$10, they were eating 3 kg meat \$30 Now, Price of bread increased to \$2, they started consuming 20 breads

2. **Necessity Goods:** What if the price of salt gets doubled? Are we going to stop using salt? No. Thus demand of necessity goods does not increase or decrease with increase or decrease in their prices. For example, salt is a necessity good whose consumption cannot be increased in case its price decreases. In such a scenario, the law of demand is not applicable.
3. **Prestige Goods:** (Conspicuous Goods) They refer to goods that are perceived as a status symbol, such as real diamond. The demand for these goods remains same in case of increase or decrease in their price. In such a case, the law of demand is not applicable.
4. **Speculation Goods:** They involve goods like commodities and assumptions of consumers about the change in prices of a product in future. If the price of a product IS expected to rise in future, then the demand for the product increases in the present situation. However, this is against the law of demand.
5. **Customers with rigid perception:** customers have different perceptions about the price of a product. Some customers have perceptions that low price means bad Quality of a particular product, which is not true in all cases. Therefore, if there is a fall in the price of a product, then the demand for that product decreases automatically.
6. **Impulsive Buying or Brand Loyalty:** They are the preferences of a consumer towards a particular brand. Consumers do not prefer to change a brand with increase in the price of that brand. For example, if a consumer prefers, to wear Levi's jeans, he would continue to purchase it, irrespective of increase in its price. In such a situation, the law of demand cannot be applied.
7. **Urgency or Emergency:** Refers to a condition for which the law of demand is not applicable. In emergencies, such as war flood, earth Quake, and famine, the availability of goods become scarce and uncertain. Therefore, in such situations, consumers prefer to store a large Quantity of goods, regardless of their prices.

4.6 ELASTICITY OF DEMAND

“Elasticity is a measure of a variable's sensitivity to a change in another variable, most commonly this sensitivity is the change in price relative to changes in other factors.

In business and economics, elasticity refers to the degree to which individuals, consumers, or producers change their demand or the amount supplied in response to price or income changes.

It is predominantly used to assess the change in consumer demand as a result of a change in a good or service's price.”

Elasticity is also defined in economics as the measurement of percentage change of one economics value in response to change in the other.

4.6.1 Price Elasticity of Demand (PED)

Price Elasticity of Demand or PED measures the responsiveness of quantity demanded to a change in price.

$$E_p = \frac{Q - Q_1}{P - P_1} * \frac{P}{Q}$$

Suppose the quantity demanded of hamburger is 30 when price INR 100 but Quantity Demanded Falls to 20 When price is increased to 120. What shall be the E_p ?

$$E_p = \frac{30 - 20}{100 - 120} * \frac{100}{30} = \frac{10}{-20} * 3.33$$

$$E_p = 0.5 * 3.33$$

$$E_p = 1.67$$

4.6.2 Cross Elasticity of Demand (XED)

Cross Elasticity of Demand (XED) is an economic concept that measures the **responsiveness in the quantity demanded of one good when the price of other goods changes**. Also called cross-price elasticity of demand, this measurement is calculated by taking the percentage change in the quantity demanded of one good and dividing it by the percentage change in the price of the other good.

Note:

Except Price Elasticity (E_p) we must consider negative value if there

The XED of Substitutes is always positive

The XED of Complements is always negative $XED = \frac{Q_{1x} - Q_{2x}}{P_{1y} - P_{2y}} * \frac{P_{1y}}{Q_{1x}}$

When the price of Coke increases from 20 to 25, the demand of Pepsi increases from 300 cans to 500 cans

$$\frac{Q_{1x} - Q_{2x}}{P_{1y} - P_{2y}} * \frac{P_{1y}}{Q_{1x}} = \frac{300 - 500}{20 - 25} * \frac{20}{300}$$

$$\frac{200}{5} * \frac{20}{300}$$

$$\frac{40}{15}$$

$$2.67$$

$$XED > 1$$

Quantity sold of Cars decreases from 30000 to 20000 per week when the price of petrol increases from 70 Rs/ltr to 103 Rs/ltr. Find out the XED and the relation between car and petrol.

$$\frac{Q_{1x} - Q_{2x}}{P_{1y} - P_{2y}} * \frac{P_{1y}}{Q_{1x}}$$

$$\frac{30000 - 20000}{70 - 103} * \frac{70}{30000}$$

$$\frac{10000}{-33} * \frac{70}{30000}$$

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$$\begin{aligned} &103 * 70/30000 \\ &10000/-33 * 70/30000 \\ &303.03 * 0.0023 \\ &-0.707 \end{aligned}$$

XED is negative so relationship is the complementary goods

4.6.3 Income Elasticity of Demand (YED)

Income Elasticity of Demand measures the responsiveness in the quantity demanded for a good or service when the real income of the consumers is changed, keeping all the other variables constant. The formula for calculating income elasticity of demand is the percent change in quantity demanded divided by the percent change in income. This concept helps us to find whether a good is a necessity or luxury.

$$\begin{aligned} &Y = \text{yield (income)} \\ &E_y = \frac{Q_1 - Q_2}{Y_1 - Y_2} * \frac{Y}{Q_1} \end{aligned}$$

The demand for iPhone was 40000 when the PCI was \$10000/- . When PCI increased to \$15000, the demand for iPhone increased to 60000. Find out the income elasticity.

$$\begin{aligned} &E_y = \frac{Q_1 - Q_2}{Y_1 - Y_2} * \frac{Y}{Q_1} \\ &40000 - 60000 / 10000 - 15000 * 10000 / 40000 \\ &-20000 / -5000 * 10000 / 40000 * 0.25 \\ &E_y = 1 \end{aligned}$$

The demand for palm oil was 10000 liters when average income was \$2000. The demand decreases to 8000 liters when average income of people increases to \$5000. What kind of good the palm oil is in this case?

$$\begin{aligned} &Q_1 - Q_2 / Y_1 - Y_2 * Y / Q \\ &10000 - 8000 / 2000 - 5000 * 2000 / 10000 \\ &2000 / -3000 * 1/5 \\ &-0.134 \end{aligned}$$

Note:

When income rises, the demand for normal and luxury goods/services tends to incline/increase
When income rises, the demand for inferior goods/services tends to decline/decrease

While calculating or measuring income elasticity, we have to consider negative sign/value

4.7 TYPES OF DEMAND

a) Demand for Producer's goods and Consumer's goods

Producer goods are the goods used for the production of other goods - either consumer goods or producer goods themselves. Examples of producer's goods

are machines, plant and equipment. Consumer goods are used for final consumption by end user. Examples of consumer's goods are apparels, Snacks, Residential houses, etc.

b) Demand for durable goods and non-durable goods

Non-durable goods are the goods which cannot be consumed more than once. There can be producer's non-durable goods as well as consumer's nondurable goods. Raw materials, fuel and power, packing items etc. are examples of non-durable producer goods. Fruits, bread, milk etc. are examples of non-durable consumer goods. These will satisfy only the current demand. Durable goods do not quickly wear out, can be consumed more than once and give utility over a period of time. There can be producers' durable goods and consumers' durable goods. Examples of durable consumer goods are: cars, refrigerators and mobile phones. Examples of producers' durable goods are building, plant and machinery, office furniture etc. are durable producer goods. The demand for durable goods is likely to be derived demand. Further, there are semi-durable goods such as, clothes and umbrella.

c) Derived demand (Cross Demand) and Autonomous demand (Independent Demand)

The demand for a product which originates because of the demand for some other product called „parent product“, „is called derived demand. For example, the demand for cement is derived demand, being directly related to building activity. Generally, the demand for producer goods or industrial inputs is derived demand. The demand for complementary goods is derived demand. If the demand for a product is independent of the demand for other goods, then it is called autonomous demand. It emerges on its own out of an innate desire of the consumer to consume or to possess the commodity. However, this distinction is purely arbitrary or subjective and it is very difficult to find out which product is entirely independent of other products.

d) Demand for firm's product and industry demand

Industry is group of firms producing homogeneous products. Hence, Industry demand means the total demand for the products of a particular industry, e.g., the total demand for passenger cars in the country. The demand for firm's product means the demand for the products of a particular firm, i.e., the quantity that a firm can dispose-off at a given price over a period of time. E.g., demand for Maruti Suzuki Car in the country. The demand for a firm's product expressed in a percentage of industry demand reveals the market share of the firm.

e) Short-run demand and Long-run demand

Short-run demand means demand which changes immediately as reaction to changes in product price and prices of related commodities, income fluctuations, ability of the consumer to adjust their consumption pattern, their

susceptibility to advertisement of new products etc. Long-run demand means the demand which exists over a long period. Most generic goods have long-term demand. Long term demand depends on long-term income trends, availability of substitutes, credit facilities etc. Long-run demand is that which will ultimately exist as a result of changes in pricing, promotion or product improvement, after enough time is allowed to let the market adjust to the new situation. For example, if electricity rates are reduced, in the short run, the existing users will make greater use of electric appliances. In the long-run, more and more people will be induced to use electric appliances

f) Demand for Producer's goods and Consumer's goods

Producer goods are used for the production of other goods - either consumer goods or producer goods themselves. Examples of such goods are machines, plant and equipment. Consumer goods are used for final consumption. Examples of consumer's goods are readymade clothes, prepared food, residential houses, etc.

g) Demand for durable goods and non-durable goods

Non-durable goods are those which cannot be consumed more than once. Raw materials, fuel and power, packing items etc. are examples of non-durable producer goods. Beverages, bread, milk etc. are examples of non-durable consumer goods. These will meet only the current demand. Durable goods do not quickly wear out, can be consumed more than once and yield utility over a period of time. Examples of durable consumer goods are: cars, refrigerators and mobile phones. Building, plant and machinery, office furniture etc. are durable producer goods. The demand for durable goods is likely to be derived demand. Further, there are semi-durable goods such as, clothes and umbrella.

h) Derived demand and Autonomous demand

The demand for a commodity that arises because of the demand for some other commodity called "parent product" "is called derived demand. For example, the demand for cement is derived demand, being directly related to building activity. Usually, the demand for producer goods or industrial inputs is derived demand. The demand for complementary goods is derived demand. If the demand for a product is independent of the demand for other goods, then it is called autonomous demand. It arises on its own out of an innate desire of the consumer to consume or to possess the commodity.

But this distinction is purely arbitrary and it is very difficult to find out which product is entirely independent of other products.

i) Demand for firm's product and industry demand

Industry demand denotes the total demand for the products of a particular industry, e.g., the total demand for steel in the country. The demand for firm's product denotes the demand for the products of a particular firm, i.e., the quantity that a firm can dispose-off at a given price over a period of time. E.g.,

demand for steel produced by the Tata Iron and Steel Company. The demand for a firm's product when expressed as a percentage of industry demand signifies the market share of the firm.

j) Short-run demand and Long-run demand

Short-run demand refers to demand with its immediate reaction to changes in product price and prices of related commodities, income fluctuations, ability of the consumer to adjust their consumption pattern, their susceptibility to advertisement of new products etc. Long-run demand refers to demand which exists over a long period. Most generic goods have long-term demand. Long term demand depends on long-term income trends, availability of substitutes, credit facilities etc. Long-run demand is that which will ultimately exist as a result of changes in pricing, promotion or product improvement, after enough time is allowed to let the market adjust to the new situation.

For example, if electricity rates are reduced, in the short run, the existing users will make greater use of electric appliances. In the long-run, more and more people will be induced to use electric appliances

4.8 DEMAND FORECASTING

The success of business depends upon decision like what to produce and how to produce. The owner or manager of business cannot take such decisions randomly. They need some facts to take such decisions. The demand forecast is the tool which can be facilitate such decisions.

4.8.1 Meaning and significance of demand forecasting What is Demand Forecasting ?

Forecasting, in general, refers to knowing or measuring the status or nature of an event or variable before it occurs.

Forecasting of demand is the art and science of predicting the probable demand for a product or a service at some future date on the basis of certain past behaviour patterns of some related events and the prevailing trends in the present.

Demand forecasting is no simple guessing, but it refers to estimating demand scientifically and objectively on the basis of certain facts and events relevant to forecasting.

❖ Significance

1. The effectiveness of the plans of business managers depends upon the level of accuracy with which future events can be predicted. Forecasting of demand plays a vital role in the process of planning and decision-making.
2. Forecast allows the firm to perform efficient business planning.
3. Demand Forecast provide information for budget and cost estimates
4. Good demand forecasts enable firm to carry efficient production planning, raw material, process selection, capacity building, factory layout and inventory

management.

5. Capital investments greatly depend on demand forecast
6. The chances for of overproduction and underproduction, excess of unused capacity and idle resources can be minimized.
7. Marketing targets depends upon sales forecasting in making decisions like advertising, publicity, sales management etc.
8. Demand forecasts also provide the necessary information for formulation of suitable pricing and advertisement strategies

4.8.2 Methods of demand forecasting

1. There are more than one methods are available for forecasting the demand. As per need, time and resources available and requirement of accuracy, the manager can choose any of the following methods.
2. Buyer's Survey:
3. This is the most direct and simple method of demand forecast. It is useful in the short run. In this method, the customers are asked what they are planning to buy during the coming time period, generally a year. It includes interview of potential customers. Following methods can be used on the bases of purpose, time available and costs to be incurred.
4. Complete enumeration method in which almost all potential customers are surveyed about their future demand.
5. Sample survey in which only a sample of potential customers are surveyed
6. End-use method, mostly used in forecasting demand for inputs

❖ Limitations of this method

7. It depends more upon customers than surveyor
8. It can have biases
9. The customers are likely to misjudge their requirements,
10. Customers can mislead the surveyors
11. Customers can change their demand due to various factors which they cannot identify or visualize at the time of the survey.
12. For household customers, this method may not be very helpful for several reasons viz. irregularity in customers' buying intentions, their inability to foresee their choice when faced with multiple alternatives, and the possibility that the buyers' plans may not be real, but only wishful thinking.

❖ Advantage

This method is useful when bulk of sale is made to industrial producers who generally have definite future plans.

1 Collective opinion method:

This method is also known as sales force opinion method or grass roots approach. Firms with a large network of sales personnel can use the knowledge, experience,

skills and exposure of the sales force to forecast future demand. In this method, salesmen are supposed to estimate expected sales in their sales territories. The logic behind method is that salesmen being closest to the customers can better know the reactions of customers to changes in the market. The estimates of all salesmen are consolidated to find out the total estimated sales. These estimates are reviewed to minimize the bias of optimism on the part of some salesmen and pessimism on the part of others. The revised estimates are further reviewed in the context of factors like proposed changes in selling prices, product designs and advertisement programmes, expected changes in competition and changes in long term trends and forces like purchasing power, income distribution, employment, population, etc. The final sales forecast would be obtained after these factors have been taken into account.

❖ **Limitations**

1. Although this method is simple and based on first-hand information of salesmen who are directly connected with sales, it can become subjective and biased as personal opinions can possibly influence the forecast.
2. Salesmen may be unaware of the broader economic changes which may have profound impact on future demand.
3. Forecasting could be useful in the short run, for long run analysis however, a better technique is to be applied.

2 Expert Opinion method:

Experts means professional market experts and consultants who have specialized knowledge about number of variables that affect demand. This method uses their varied experience. This enables to get reasonably reliable forecast of demand in future. Information is collected from them through properly structured unbiased tools of data collection such as interviews and questionnaires.

In this method, The Delphi technique, developed by Olaf Helmer at the Rand Corporation of the USA, has given a method to obtain opinions from experts belonging to variety of fields. It avoids the disadvantages of conventional panel meetings. In this technique, instead of depending upon the opinions of buyers and salesmen, firms ask the opinion of experts through a series of carefully designed questionnaires. Experts are asked to provide forecasts and reasons for their forecasts. Experts are provided with information and opinion feedbacks of others at different rounds without revealing the identity of the opinion provider. These opinions are then exchanged among the various experts and the process goes on until convergence of opinions is arrived at.

❖ **Advantages**

1. Best suited in circumstances where intractable changes are occurring and the relevant knowledge is distributed among experts.

2. Delphi technique is widely accepted due to its broader applicability and ability to address complex questions.
3. Also has the advantages of speed and cheapness.
4. **Statistical methods:** Statistical methods are very useful in forecasting demand. Statistical methods are considered as superior methods because they are more scientific, reliable and free from subjectivity. Following are the important statistical methods of demand forecasting:
5. Trend Projection Method
6. Regression Analysis

Trend Projection method: This method, is also known classical method. A firm which has been doing business for a reasonably long time would have accumulated considerable data on sales pertaining to different time periods. Such data, when arranged chronologically, give a „time-series“. The time series relating to sales represent the past pattern of effective demand for a particular product. Such data can be used to project the trend of the time series. The trend projection method assumes that factors responsible for the past trend in demand will continue to operate in the same manner and to the same extent as they did in the past in determining the magnitude and direction of demand in future. The popular techniques of trend projection based on time series data are;

Graphical Method: This method, also known as „free hand projection method“ is the simplest and least expensive. This method plots of the time series data on a graph paper and fitting a free- hand curve to it passing through as many points as possible. The direction of the curve shows the trend. This curve is extended into the future for deriving the forecasts. The direction of this free hand curve shows the trend. The main draw-back of this method is that it may show the trend but the projections made through this method are not very reliable.

Fitting trend equation (Least Square Method): It is a mathematical method for fitting a line to a set of observed data points in such a manner that the sum of the squared differences between the calculated and observed value is minimized. This technique is used to find a trend line which best fit the available data. This trend is then used to project the dependent variable in the future. This method is very popular because it is simple and inexpensive. Moreover, the trend method provides fairly reliable estimates of future demand. The least square method is based on the assumption that the past rate of change of the variable under study will continue in the future. The forecast based on this method may be considered reliable only for the period during which this assumption holds. The major limitation of this method is that it cannot be used where trend is cyclical with sharp turning points of troughs and peaks. Also, this method cannot be used for short term forecasts.\

Regression analysis: This is the most popular method of forecasting demand. Under this method, a relationship is established between the quantity demanded (dependent variable) and the independent variables (explanatory variables) such as income, price of the good, prices of related goods etc. Once the relationship is

established, we derive regression equation assuming the relationship to be linear. The equation will be of the form $Y = a + bX$. There could also be a curvilinear relationship between the dependent and independent variables. Once the regression equation is derived, the value of Y i.e. quantity demanded can be estimated for any given value of X.

❖ **Controlled Experiments:**

In this method, future demand is forecasted by conducting market studies and experiments on consumer behaviour under actual, though controlled, market conditions. It is also known as market experiment method. It measures the respond of demand to separately certain determinants of demand. The determinants are manipulated, for example, price, advertising, etc., and conduct the experiments assuming that the other factors are constant. In this way, the effect of demand determinants like price, advertisement, packaging, etc., on sales can be assessed by either varying them over different markets or by varying them over different time periods in the same market. The responses of demand to such changes over a period of time are recorded and are used for assessing the future demand for the product. The condition to apply this method is, that the market divisions here must be homogeneous with regard to income, tastes, etc.

❖ **Limitations**

7. These methods are used relatively less because they are expensive and time consuming.
8. These methods are Risky because they can result into unfavourablereactions from dealers, consumers and competitors.
9. It is also difficult to determine what conditions should be taken as constant and what should be as variable
10. The condition of homogeneity of markets is difficult to be satisfied.
11. Market experiments can be replaced by “controlled laboratory experiments” or “consumer clinics” where consumers are given an equal sum of money and asked to spend in a store on goods with varying prices, packages, displays etc. The responses of the consumers are recorded and used for demand forecasting.

❖ **Barometric methods of forecasting (Economic Indicators Method):**

As the barometer is used to forecast weather, the economic indicators are used to forecast trends in business activities. This information is used to forecast demand prospects of a product, though not the actual quantity demanded. For this purpose, an index of relevant economic indicators is constructed.

Movements in these indicators are used as basis for forecasting the likely economic environment in the near future.

DEMAND ANALYSIS AND FORECASTING

❖ There are leading indicators, coincidental indicators and lagging indicators.

- The leading indicators are the factors which move up or down ahead of some other series. For example, the large advance orders for machineries and commercial vehicles give a leading indication of economic prosperity.
- The lagging indicators are seen after the event or trend has already occurred i.e., after sometime lag. The large number of household electrical connections indicates the fact that heavy construction work was undertaken during the past with a lag of some time.
- The coincidental indicators, however, move up and down simultaneously with the level of economic activities. For example, rate of unemployment.

4.8.3 Criteria of Good Demand Forecasting

13. The good demand forecast should conform to the need of business firm
14. The good demand forecast should be as accurate as possible
15. The good demand forecast should provide conclusions on right time
16. The good demand forecast should assure the low cost
17. The good demand forecast should be scientific and reliable

❖ CHECK YOUR PROGRESS

1. MCQs

What makes a demand?	Desire to purchase	Ability to purchase	Willingness to pay the price	All	D
Which one of following is more useful concept in Economics?	Need	Want	Demand	None	C
When fashion changes favorably to product, the demand of the product does	Increases	Decreases	Constant	Uncertain	A
When there is expectation of increase in price in future, the current demand	Increases	Decreases	Constant	Uncertain	A
When population decreases, the demand	Increases	Decreases	Constant	None	B
When Income of people increases, the demand for low quality/inferior products tend to _____	Increases	Decreases	Constant	None	B
According to the law of demand, demand decreases when price_____	Increases	Decreases	Constant	None	A
The law of demand was given by_	Adam Smith	Keynes	Alfred Marshall	Robins	C
When price increases, the supply_____	Decreases	Constant	Uncertain	Increases	D
The slope of demand curve is_____	Positive	Negative	Vertical	Horizontal	B

The slope of supply curve is _____	Positive	Negative	Vertical	Horizontal	A
The Law of demand can be explained with the help of _____	Demand Schedule	Demand Curve	Both	None	C
Which of the following is/are the exceptions to the law of demand?	Giffen Goods	Veblen Goods	Future expectation about price	All	D
Which of the following methods of demand forecasting depends upon direct information from consumers?	Buyers' Survey	Trend Projections	Linear Programming	None	A
The goods which are used to produce final goods are called _____	Consumers' goods	Producers' goods	Durable Goods	None	B
Which of the following goods cannot be consumed more than once?	Consumers' goods	Producers' goods	Durable Goods	Non-durable goods	D
The goods which can be consumed independently is called _____	Consumers' goods	Producers' goods	Autonomous Goods	Supplementary goods	C

2. Short Questions

1. Describe any five assumptions of the law of demand.
2. Define and describe the law of demand.
3. Write any five exceptions of the law of demand.
4. Write down any five factors affecting demand.
5. Write down the concept of elasticity of demand.
6. Define demand forecast.
7. Briefly describe cross elasticity
8. What is Income Elasticity?
9. Differentiate between short-run demand and long-run demand.
10. Write limitations of buyer's survey method

3. Long Questions

1. Write a detailed note on the Factors affecting demand.
2. Discuss in detail any six types of demand.
3. Explain the law of demand with assumptions and exceptions.
4. Write a detailed note on demand forecasting methods.
5. Illustrate the types of demand elasticity with suitable examples.

5.0 INTRODUCTION**5.1 CONCEPT AND DEFINITION OF SUPPLY****5.2 THE LAW OF SUPPLY****5.3 FACTORS AFFECTING SUPPLY****5.4 ELASTICITY OF SUPPLY****5.4.1 METHODS OF SUPPLY ELASTICITY****5.4.2 TYPES OF SUPPLY ELASTICITY****5.5 EQUILIBRIUM OF PRICE AND DEMAND****❖ CHECK YOUR PROGRESS**

5.0 INTRODUCTION

Suppose Mr. Sandip is a baker and sells pastries. At present he has 100 pastries at his bakery. But he has arranged party for 25 people at his home where he is going to serve 25 pastries.

The 75 pastries are there to be sold at Rs. 100 each within 48 hours. So, what are the answers of the questions given below?

- **What is total supply here? Is it 100 or 75?**
- **What if someone wants to buy his pastries at Rs 50?**
- **What if someone comes to buy pastries after week?**
- **Let's have the answers to these questions from the following discussion**

5.1 CONCEPT AND DEFINITION OF SUPPLY

The term “supply” refers to the amount or volume of a good or service that the producers are willing and able to offer to the market at certain during a period of time.

Supply refers to what firms offer for sale, not necessarily to what they succeed in selling. What is offered may not get sold.

Supply is a flow. The quantity supplied is “so much” per unit of time, per day, per week, or per year

❖ Definition

Supply of a commodity means quantity of the commodity which is actually offered for sale at a given price during some particular time.

The definition of supply is complete when it has the following elements:

1. Quantity of a commodity offered for sale;
2. Price of the commodity; and
3. Time during which the quantity is offered.
4. The word “Supply” implies the amount offered for sale at a given price.

Like demand, supply is always at a price and it relates to a point of time.

The relationship between price and quantity is inverse in the case of demand. However, in the case of supply the relationship between the two variables price and quantity is direct. The term “stock” implies a fixed quantity while the term “supply” implies that the amount offered can be increased or decreased.

❖ Stock Vs Supply

Stock is the actual quantity of a commodity, which can be brought into the market for sale at short notice. Supply refers to that part of the stock, which is actually offered for sale at a given price in the market.

5.2 THE LAW OF SUPPLY

“Law of supply states that other things remaining the same, the quantity of any commodity that firms will produce and offer for sale rises with rise in price and falls with fall in price.” i.e., Higher the price, higher will be quantity supplied and lower the price smaller will be quantity supplied.

“Other things remaining the same” means determinants other than own price such as technology, goals of the firm, government policy, price of related goods etc. should not change.

The law of supply states that other factors being constant more quantities of a commodity are supplied at a higher price and fewer quantities are supplied by the sellers in the market at lower price. Following are the assumptions on which the law of supply is based on

❖ Assumptions

1. Inputs cost remains unchanged
2. Technological methods remain constant
3. Price of related goods is constant
4. No change in transport cost
5. Government policies are unchanged
6. No anticipation of prices by the sellers
7. The level of foreign trade is unchanged
8. No change in climatic conditions

The law of supply can be explained with the help of supply schedule and supply curve.

A supply schedule is a tabular statement showing various quantities which producers are willing to produce and sell at various alternative prices during a

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given period of time. A supply schedule may be individual supply schedule or market supply schedule.

Table 8 : Supply schedule of Good "X"

Price	Quantity Supplied
1	5
2	35
3	45
4	55
5	65

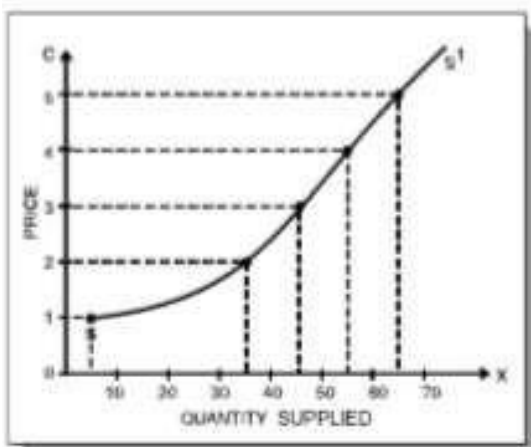


Fig. 19 : Supply Curve

5.3 FACTORS AFFECTING SUPPLY

1, Objectives of the Firm

Different firms may follow different objectives. Some firms may be interested in maximizing profits, while others may be interested in sales or revenue maximization or satisfying etc. The amount of commodity supplied is often influenced by the objectives of the firm. Normally, sales maximization firm's output will be greater than the profit maximization firm's output.

2. State of Technology

The supply of a particular product depends upon the state of technology also. Inventions and innovations tend to make it possible to produce more or better

goods with the same resources, and thus they tend to increase the quantity supplied of some products and to reduce the quantity supplied of products that are displaced.

3. Political Disturbances

Political disturbances may threaten trade and thus create a scarcity for certain kinds of goods.

4. Government Policy

Any change in the government's policy will affect the supply. If the government imposes an excise duty on a particular product the firm may supply the same amount of it at a higher price or reduce its supply at the same price. It implies that the imposition of an excise duty causes a leftward shift in the supply curve. A subsidy, on the other hand by decreasing costs, would enable the supply curve to move to the right.

5. Future Price Expectations

The supply of a commodity in the market at any time is also influenced by the seller's expectation of future prices. If the sellers anticipate in future a rise in prices, they may reduce the present supply of the product. On the contrary, if they expect a fall in prices in future they will be tempted to sell more at the current price.

6. Industrial Peace

The existence of industrial peace is a precondition for regular supply. If the industry is subject to strikes or lockouts, it will have its impact on the supply of the commodity.

7. Natural Factors

Natural factors like changes in weather conditions, floods, drought, pest attack etc. affect supply. This is more pronounced in agricultural production. Moreover, the occurrence of abnormal or extraordinary situations like war, fire etc. also affect the supply of products.

8. Prices of Factors of Production

The cost of production is an important item affecting the supply. A fall in input prices will reduce the cost of output. As a result, more quantity could be supplied at the old price or, the original quantity could be produced at a lower price. A rise in the prices of inputs will have the opposite effect.

9. Price of the Good which is to be supplied

Other things being equal, the higher the relative price of goods the greater the quantity of it that will be supplied. This is because goods and services are produced by the firm in order to earn profits and, ceteris paribus, profits rise if the price of its product rises.

5.4 THE ELASTICITY OF SUPPLY

The elasticity of supply is defined as the responsiveness of the quantity supplied of a good to a change in its price. Elasticity of supply is measured by dividing the percentage change in quantity supplied of a good by the percentage change in its

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price.

5.4.1 Methods of Supply Elasticity

1 Percentage change method

$E_s = \% \text{ change in quantity supplied of good} / \% \text{ change in price of good}$

Or

$$E_s = \% \Delta Q / \% \Delta P$$

- Q denotes original quantity supplied.
- ΔQ denotes change in quantity supplied.
- P denotes original price.
- ΔP denotes change in price

Or

$$E_s = (Q - Q_1) / (P - P_1) \times P / Q$$

Example

Suppose the price of commodity X increases from 2,000 per unit to 2,100 per unit and consequently quantity supplied increases from 2500 units to 3,000 units. Calculate the elasticity of supply.

Here, $Q = 2500$, $Q_1 = 3000$, $P = 2000$, $P_1 = 2100$

So, $(2500 - 3000) / (2000 - 2100) \times 2000 / 2500$

So, $500 / 100 \times 2000 / 2500$ So, $E_s = 4$

2 Point Elasticity of Supply:

The elasticity of supply can be considered with reference to a given point on the supply curve or between two points on the supply curve. When elasticity is measured at a given point on the supply curve, it is called point elasticity. Just, as in demand, point-elasticity of supply can be measured with the help of the following formula

$$E_s = \frac{dq}{dp} \times \frac{p}{q}$$

Qus: The Supply function is given as $q = -100 + 10p$. Find the elasticity of supply using point method, when price is 15.

$$E_s = \frac{dq}{dp} \times \frac{p}{q}$$

Since $\frac{dq}{dp} = 10$, $p = 15$, $q = -100 + 10(15)$

$$q = 50$$

$$\therefore E_s = 10 \times \frac{15}{50}$$

$$\text{or } E_s = 3$$

Where $\frac{dq}{dp}$ is differentiation of the supply function with respect to price and p and q refer to price and quantity respectively.

$Q = -50 + 5p$, $p = 30Q = -50 + 150$
 $Q = 100$
 $5 \times 30/100$
 $E_s = 1.5$

3 Arc-Elasticity

Arc-elasticity i.e. elasticity of supply between two prices can be found out with the help of the following formula.

$$E_s = - \frac{q_1 - q_2}{\frac{q_1 + q_2}{2}} \cdot \frac{p_1 + p_2}{p_1 - p_2}$$

or

$$E_s = - \frac{q_1 - q_2}{\frac{q_1 + q_2}{2}} \cdot \frac{p_1 + p_2}{p_1 - p_2}$$

Where p_1 q_1 are original price and quantity and p_2 q_2 are new price and quantity supplied.

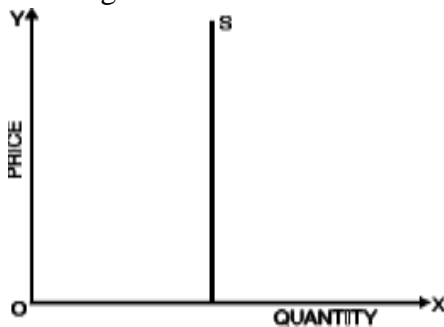
Example: when $p_1 = 12$, $p_2 = 15$, $q_1 = 20$ units and $q_2 = 50$ units.

$$E_s = \frac{20 - 50}{\frac{20 + 50}{2}} \times \frac{12 + 15}{12 - 15}$$

$$\frac{30}{70} \times \frac{27}{-3} = -3.85$$

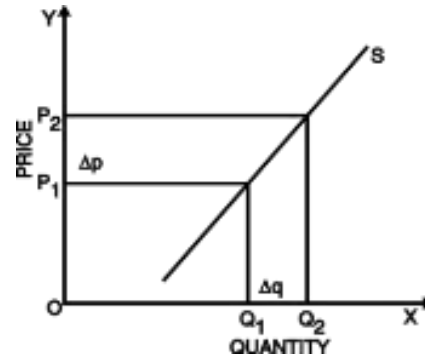
5.4.2 Types of Elasticity

- (i) **Perfectly inelastic supply:** If as a result of a change in price, the quantity supplied of a good remains unchanged, we say that the elasticity of supply is zero or the good has perfectly inelastic supply. The vertical supply curve shows that irrespective of price change, the quantity supplied remains unchanged.

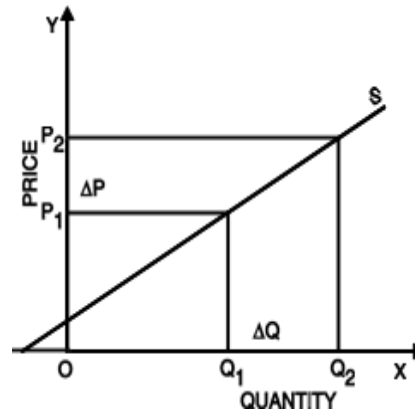


- (ii) **Relatively less-elastic supply:** If as a result of a change in the price of a good its supply changes less than proportionately, we say that the supply of the good is relatively less elastic or elasticity of supply is less than one. Figure shows that the relative change in the quantity supplied (Δq) is less than the relative change in the price (Δp).

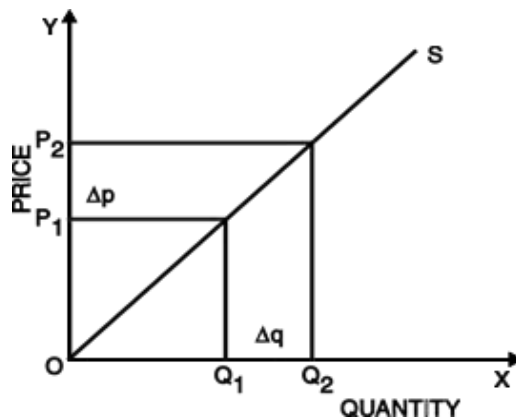
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- (iii) **Relatively greater-elastic supply:** If elasticity of supply is greater than one i.e., when the quantity supplied of a good change substantially in response to a small change in the price of the good, we say that supply is relatively elastic. Figure shows that the relative change in the quantity supplied (Δq) is greater than the relative change in the price.



- (iv) **Unit-elastic:** If the relative change in the quantity supplied is exactly equal to the relative change in the price, the supply is said to be unitary elastic. Here the coefficient of elasticity of supply is equal to one. In Figure, the relative change in the quantity supplied (Δq) is equal to the relative change in the price (Δp).



- (v) **Perfectly elastic supply:** Elasticity of supply said to be infinite when nothing is supplied at a lower price, but a small increase in price causes supply to rise from zero to an infinitely large amount indicating that producers will supply any quantity demanded at that price.



5.5 EQUILIBRIUM OF PRICE AND DEMAND

The demand curve shows the quantities of a particular good or service that buyers will be willing and able to purchase at each price during a specified period. The supply curve shows the quantities that sellers will offer for sale at each price during that same period. By putting the two curves together, we can find out a price at which the quantity buyers are willing and able to purchase equals the quantity sellers will offer for sale.

Equilibrium and change in equilibrium

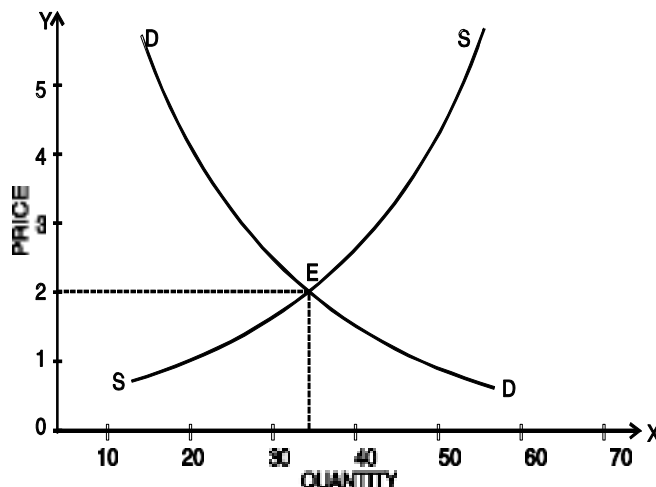
- In socialist economy the government controls the price determination
- In mixed economy, the government fixes the prices of essential commodities like fuel, grains, drugs and medicines etc.
- In a free market economy, the price is determined by market forces like demand and supply.

Price Determination through Demand and Supply

The price where quantity demanded and quantity supplied get equal is called equilibrium price. The quantity at that price will be equilibrium quantity.

	Price (₹)	Demand Units	Supply (Units)
1	1	60	5
2	2	35	35
3	3	20	45
4	4	15	55
5	5	10	65

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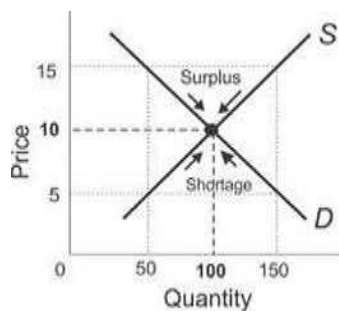
It is seen that at point E, the Equilibrium price is 2 and equilibrium quantity is 35.

Self-adjusting Equilibrium in Surplus and Shortage

Equilibrium is said to be stable if any disturbance to it is Self-adjusting so that the original equilibrium is restored. In other words, if the equilibrium be disrupted, the market returns to equilibrium. It should be noted that it would be stable only if other things are equal.

The Surplus and Self-adjusting Equilibrium

The following diagram will demonstrate how stable equilibrium is achieved through price mechanism or market mechanism. If the market price is above the equilibrium price, say ` 15, the market supply is greater than market demand and there is an excess supply or surplus in the market. Competing sellers will lower prices in order to clear their unsold stock. As we know, other things remaining constant, as price falls quantity demanded rises and quantity supplied falls. In this process the supply-demand gap is reduced and eventually eliminated thus restoring equilibrium.



Shortage and Self-adjusting Equilibrium

If the prevailing market price is below equilibrium, say ` 5 in our example, a shortage arises as quantity demanded exceeds the quantity supplied. The shortage prompts the price to rise, as the buyers, who are unable to obtain as much of the good as they desire, bid the price higher. The market price tends to increase. Other

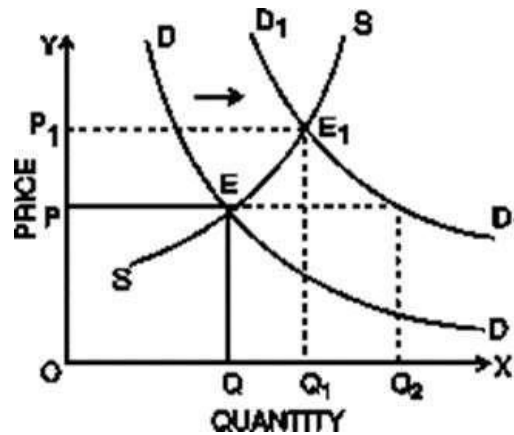
things remaining the same, the price rise causes a decrease in the quantity demanded by the buyers and an increase in the quantity supplied by the sellers and vice versa. This process will continue as long as demand exceeds supply. The market thus achieves a state where the quantity that firms sell is equal to the quantity that the consumers desire to buy. At equilibrium price (\hat{P}), the supply decisions of the firms tend to match the demand decisions of the buyers.

Thus, the equilibrium is restored automatically, through the fundamental working of the market and price movements eliminate shortage or surplus.

Change in Either Demand or Supply

An increase in demand and supply stable (Rightward Shift in Demand) The causes for increase in demand/ rightward shift to demand curve.

1. Increase in population
2. Increase in the price of substitute
3. Decrease in the price of complement
4. Increase in overall income of customers/consumers (and goods are normal and luxury)
5. Favorable change in taste, fashion and preference of consumers
6. Future expectations about increase in the price of goods
7. Liberal policy of exports



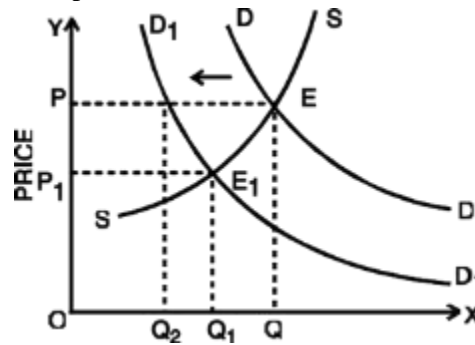
Conclusion: Equilibrium quantity increases and equilibrium price also increases.

A decrease in demand and supply stable (Leftward Shift in Demand Curve) The causes for decrease in demand/ leftward shift to demand curve.

1. Decrease in population
2. Decrease in the price of substitute
3. Increase in the price of complement
4. Decrease in the income of consumers (when goods are normal and luxuries)
5. Unfavourable change in fashion, taste and preferences of consumers
6. Future expectations about decrease in the price of goods

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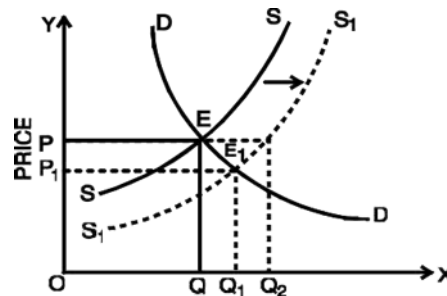
7. Strict policy of exports



Conclusion: Equilibrium quantity decreases and equilibrium price decreases.

An Increase in supply and demand stable (Rightward shift in Supply Curve)

1. Decrease in the price of related goods/substitutes
2. Decrease in the price of production factors
3. Advancement/innovation/invention in technology
4. Introduction/increase in subsidy by government
5. Reduction/withdrawal of taxes, duties by government
6. Discovery/Exploration of new sources of raw material
7. Favorable weather condition
8. Lack of Man-made casualties like war, riots, strike, industrial unrest etc.
9. Favorable government policy (permission to Import)



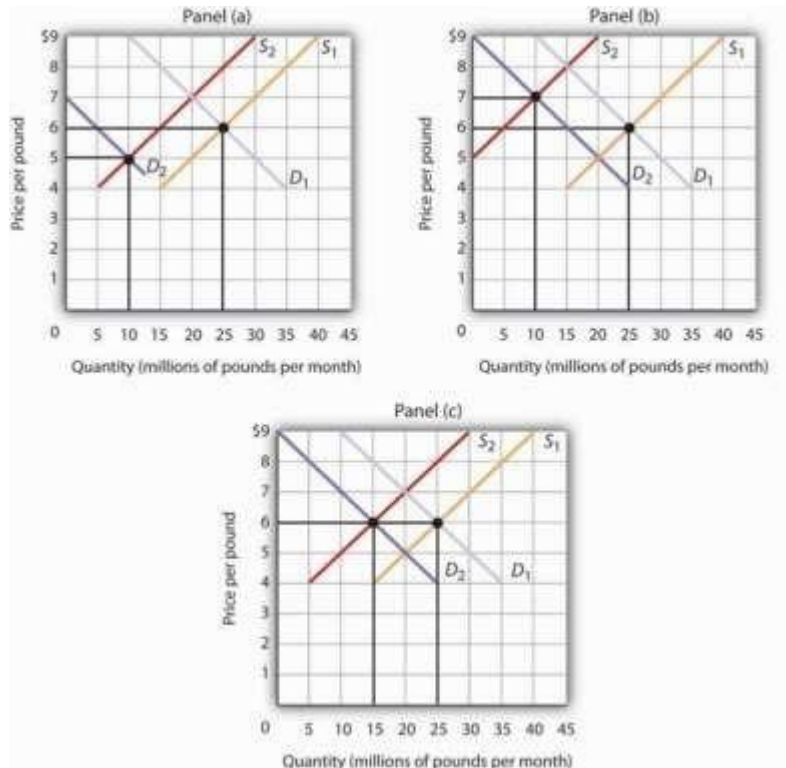
Conclusion: Equilibrium Quantity increases and equilibrium price decreases A decrease in supply and demand stable (Leftward shift in Supply Curve)

1. Increase in the price of related goods/substitutes
2. Increase in the price of production factors
3. Backwardness or retrogression of technology
4. Withdrawal or reduction in subsidy by government
5. Introduction of new taxes or increase in tax slabs, duties by government
6. Depletion of resources
7. Unfavorable weather condition
8. Unfavorable government policy

Situations of Simultaneous Shifts in Demand-Supply curve

As we have seen, when either the demand or the supply curve shifts, the results are

unambiguous; that is, we know what will happen to both equilibrium price and equilibrium quantity, so long as we know whether demand or supply increased or decreased. However, in practice, several events may occur at around the same time that cause both the demand and supply curves to shift. To figure out what happens to equilibrium price and equilibrium quantity, we must know not only in which direction the demand and supply curves have shifted but also the relative amount by which each curve shifts. Of course, the demand and supply curves could shift in the same direction or in opposite directions, depending on the specific events causing them to shift.



Conclusions

- If demand and supply both are decreasing but decrease in demand is greater than decrease in supply, then, the equilibrium quantity will decrease and price will also decrease. (PanelA)
- If demand and supply both are decreasing but decrease in supply is greater than decrease in demand, then, the equilibrium quantity will decrease but price will increase. (Panel B)
- If demand and supply both are decreasing but decrease in demand is equal to decrease in supply, then, the equilibrium quantity will decrease but price will remain the same. (PanelC)

❖ CHECK YOUR PROGRESS

1. Multiple Choice Question

1. Supply means _____ .
 - a. Ability to supply
 - b. Willingness to supply
 - c. Both
 - d. None

2. Supply is a _____ concept.
 - a. Stock
 - b. Flow
 - c. Vague
 - d. Clear

3. Which of the following is/are the method/s to measure the supply?
 - a. Percentage
 - b. Point
 - c. Arc
 - d. All the above

4. Which of the following will not result into increase in supply?
 - a. Increase in subsidy
 - b. Improvement in technology
 - c. Increase in taxes
 - d. None

5. The supply curve of perfectly inelastic demand is _____
 - a. Vertical
 - b. Horizontal
 - c. Hyperbola
 - d. None

Answers: (C, B, D, C, A)

2. Short Questions

1. Define the term Supply.
2. What is supply elasticity? Explain it in brief.
3. What is equilibrium? Explain with demand and supply curve Explain the situation of shortage.
4. Explain the point method of elasticity.

3. Long Questions

Discuss the factors affecting supply elasticity Elaborate the Law of Supply.
Discuss the methods of supply elasticity.
Explain with diagrams the changes in equilibrium Explain the types of elasticity.

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❖ CONSUMPTION:

- 6.1 CONSUMER BEHAVIOUR
- 6.2 CARDINAL APPROACH TO CONSUMER EQUILIBRIUM
- 6.3 THE ORDINAL UTILITY THEORY
- 6.4 DERIVATION OF DEMAND CURVE BY USING INDIFFERENCE CURVE APPROACH

❖ INVESTMENT FUNCTION:

- 6.5 INVESTMENT FUNCTION
- 6.6 CAPITAL BUDGETING.
- 6.7 MARGINAL EFFICIENCY OF CAPITAL AND BUSINESS EXPECTATIONS, MULTIPLIER, ACCELERATOR

6.1 CONSUMER BEHAVIOUR

Introduction:

- In Consumer behaviour, we study how individual customers, groups or organizations select, buy, use and dispose of ideas, goods and services to satisfy their needs and wants. It discusses the actions of the consumer in the marketplace and the underlying motives of those actions.
- It is assumed that consumers are role player in the market place. Consumers play a various role in the marketplace. Beginning from the information provider, from the user to payer and disposer. Consumers play these roles in the decision process.

Definitions of consumer behaviour

In the view of Engel, Blackwell, and Mansard, “consumer behaviour is the actions and decision processes of people who purchase goods and services for personal consumption”. **Louden and Bitta define**, “consumer behaviour is the decision process and physical activity, which individuals engage in when evaluating, acquiring, using or disposing of goods and services”.

Nature of consumer behaviour**1. Factors:**

The various factors that influence the consumer behaviour are as follows:

- Marketing factors such as product design, price, promotion, packaging, positioning and distribution.
- Personal factors such as age, gender, education and income level.
- Psychological factors such as buying motives, perception of the product and attitudes towards the product.
- Situational factors such as physical surroundings at the time of purchase, social surroundings and time factor.

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- Social factors such as social status, reference groups and family.
- Cultural factors, such as religion, social class—caste and sub-castes.

2. Continuous changes:

Consumer behaviour is not static. It changes over some time depending on the nature of the products. For example, kids prefer colourful and fancy footwear, but as they grow up as teenagers and young adults, they prefer trendy footwear, and as middle-aged and senior citizens they prefer more sober footwear. The change in buying behaviour may take place due to several other factors such as the increase in income level, education level and marketing factors.

3. Varies from consumer to consumer:

All consumers behave differently. The differences in consumer behaviour are due to individual factors such as the nature of the consumers, lifestyle, and culture. For example, some consumers are techno users. They go on shopping and spend beyond their means. They borrow money from friends, relatives, banks, and at times even adopt unethical means to spend on shopping for advanced technologies. But there are other consumers who, despite having surplus money, do not go even for the regular purchases and avoid the use and purchase of advanced technologies.

4. Varies from region to region and country to country:

Consumer behaviour varies across states, regions and countries. For example, the behaviour of the urban consumers is different from that of the rural consumers. A good number of rural consumers are conservative in their buying behaviours.

The rich rural consumers may think twice to spend on luxuries despite having sufficient funds, whereas the urban consumers may even take bank loans to buy luxury items such as cars and household appliances. Consumer behaviour may also vary across the states, regions and countries. It may differ depending on the upbringing, lifestyles and level of development.

5. Information regarding consumer behaviour

Marketers need to have a good knowledge of consumer behaviour. They need to study the various factors that influence the consumer behaviour of their target customers. The knowledge of consumer behaviour enables them to take appropriate marketing decisions in respect of the following factors.

- Product design/model
- Pricing of the product
- Promotion of the product
- Packaging
- Positioning
- Place of distribution

6. Leads to purchase decision:

A positive consumer behaviour leads to a purchase decision. A consumer may decide between buying a product based on different buying motives. The purchase decision leads to higher demand, and the sales of the marketers increase. Therefore, marketers

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need to influence consumer behaviour to increase their purchases.

7. Varies from product to product:

Consumer behaviour is different for different products. Some consumers may buy more quantity of certain items and very low or no quantity of other items. For example, teenagers may spend heavily on products such as cell phones and branded wears for snob appeal, but may not spend on general and academic reading. A middle-aged person may spend less on clothing but may invest money in savings, insurance schemes, pension schemes, and so on.

8. Improves standard of living:

The buying behaviour of the consumers may lead to higher standard of living. The more a person buys the goods and services, the higher is the standard of living. But if a person spends less on goods and services, despite having a good income, they deprive themselves of a higher standard of living.

9. Reflects status:

Consumer behaviour is not only influenced by the status of a consumer, but it also reflects it. The consumers who own luxury cars, watches and other items are considered to belong to a higher status. The luxury items also give a sense of pride to the owners.

6.2 CARDINAL APPROACH TO CONSUMER EQUILIBRIUM:

• Introduction:

- Consumer's demand for a product depends upon the price of a product, income of the individual, the price of related goods. In a functional form, it can be written as follows.

$$D = f(P, I, W, P_r, \dots \text{ETC})$$

Where, D = Demand
F = shows functional relationship
P = Price of Product
I = Income of an individual
W = Wealth
Pr = Price of related Products

But among these elements of demand, economists pick out the price of a good in question as the most important factor governing the demand for it.

- Certainly, the function of a theory of demand is to create a relationship between the quantity demanded a good and its price and to deliver an explanation for it.
- Occasionally, many theories have been propounded to explain consumer's demand for a product and to derive a valid demand theorem.
- Cardinal utility analysis is the eldest theory of demand which provides an explanation

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of a consumer's demand for a product and derives the law of demand.

- Cardinal utility analysis of the theory of demand had been criticized and consequently. Some alternative theories, namely **Indifference Curve Analysis**, **Samuelson's Revealed Preference Theory**, have been propounded.
- Here, we will discuss the cardinal utility approach. Though it is the eldest approach, its final shape emerged at the hands of '**Marshall**'. Therefore, it is also called '**Marshallian Utility Analysis of Demand**'.

❖ MEANING OF UTILITY:

- People demand and consume goods because they satisfy their wants.
- The utility means "**want-satisfy power of a commodity**". It is also defined as a feature of the commodity which satisfies the wants of a consumer.
- Utility is a subjective thing and stays in the mind of people. People recognise the utility of goods by their psychological feeling.
- The desire for commodity by a person depends upon the utility he expects to obtain from it. The greater the utility he expects from a commodity, the greater his desire for that commodity.
- There is no ethics or morality involved in the use of word utility in economics.
- The commodity may not be beneficial in the usual sense of the term even then it may give utility to some people. For example, alcohol may harm a person but it possesses utility for a person whose want it satisfies.

❖ MEANING OF TOTAL UTILITY AND MARGINAL UTILITY:

- "**The utility is the satisfaction that an individual receives from consuming a good or service. Similarly, total utility is the total satisfaction derived from consuming a given total quantity of a good or service.**" Total utility has been illustrated in the following table.

Number of given commodity (mangoes)	Utils
1	20
2	15
3	10
Total Utility	45

- It can be seen from the above table 6.1, the first mango is the best out of the lot available to consumer and thus gives him the highest satisfaction, measured as 20 utils. The second mango is the naturally second best with lesser amount of the utility than the first, and has 15 utils, the third mango has 10 utils. In this illustration, the total utility of two mangoes is 35 (20+15) utils, of three mangoes 45 (20+15+10) utils.
- It should be noted that as the unit of commodity increases, total utility increases at a diminishing rate. Because when the want of the customer for a particular good or

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commodity is fully satisfied by consuming a fixed quantity of the commodity, further increases in consumption of the commodity will cause a decrease in the total utility of the consumer. For example, if one consumer is thirsty, he consumes one glass of water, so that one glass of water will give him much utility, if he continues to drink water his utility will decrease. The number of units of commodity consumed at which a consumer is fully satisfied is known as satiation quantity.

- Marginal utility of a commodity to a consumer is the “*additional utility received from the consumption of one more unit of given commodity*”. From the above table no. 1, the total utility of two mangoes is 35 utils. When the consumer consumes the third mango, the total utility becomes 45 utils. Thus, the marginal utility of third mango is 10 utils. (45-35).
- In other words, marginal utility of a commodity is loss in the utility if one unit less is consumed. It can be expressed as “ $MU_n = TU_n - TU_{n-1}$ ”
- In terms of calculus, it can be presented as $MU_n = \Delta TU \div \Delta Q$, where, n is any given number, MU is marginal utility, TU is total utility, Δ shows changes. Thus, change in total utility divided by change in quantity is known as marginal utility.
- **Assumption of Marshall’s Cardinal Utility Analysis:**

Marshall’s cardinal utility analysis is based upon certain important assumptions. It is necessary to describe the basic assumption on which the whole cardinal utility analysis rests. These basic assumptions are as follows.

1. The cardinal measurement of utility:

- The cardinal utility theory holds that utility is measurable and quantifiable utility. According to this theory, a person can show the utility or satisfaction he receives from the goods in quantitative cardinal terms. Under cardinal measurement of utility, person can compare utility in respect of size, that is, how much one level of utility is greater than another. For example, a person gets 10 utils from the consumption of a unit of good A, and 20 utils from consumption of a unit of good B. He can say whether the utility he receives from the consumption of one unit of good B is double the utility he receives from the consumption of one unit of good A.
- *In the view of Marshall*, marginal utility can be measured in terms of money. According to him, the amount of money shows the general purchasing power and it can be therefore considered as a command over alternative utility-yielding goods. He claims that the amount of money which a person is ready to pay for a unit of a good rather than go without it is a measure of the utility he obtains from that good. Therefore, money is the measuring rod of utility.
- Many economists belonging to the Cardinalist school measure utility in imaginary units called ‘utils’. They assume that a consumer is capable of expressing that one good provides him utility equal to 4 utils. On this ground, he can express that he obtains twice as much utility from a good as compared to another good.

2. The supposition of independent utilities:

- Under this assumption, the utility which a consumer obtains from a good is the function of the quantity of that good and of that good only. It implies that the utility which a consumer receives from a good does not depend on the quantity consumed of

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other goods; it depends upon the quantity purchased of that good alone.

- Regarding this assumption, the total utility which a person gets from the whole collection of goods purchased by him is the total sum of the separate utilities of the goods. Therefore, Cardinalist school regards utility as 'additive'; that is distinct utilities of different goods can be added to receive the total sum of the utilities of all goods purchased.

3. Dependability of the marginal utility of money:

- Another important assumption of the cardinal utility analysis is the dependability of the marginal utility of money. Therefore, while the cardinal utility analysis assumes that marginal utilities of commodities decrease as more of them are purchased or consumed, but the marginal utility of money remains constant throughout when the individual is spending money on a good and due to which the amount of money with him varies. Marshall adopted this assumption in his famous book "Principle of Economics" which was first introduced by Daniel Bernoulli.
- According to Marshall, utility can be measured in terms of money. But measurement of marginal utility of goods in terms of money is only possible if the marginal utility of money itself remains constant. The assumption of constant marginal utility of money is very critical to Marshallian analysis, because money which is the unit of measurement itself varies as one is measuring with it, it cannot then yield correct measurement of the marginal utility of goods.
- Marshall assumes that marginal utility of money remains constant on the basis of following ground that the individual consumer's expenditure on any one thing is only a small portion of his whole expenditure, but Marshall ignored, when the price of good decreases and as a result the real income of the consumer increases, Similarly, when the price of a good increases the real income of the consumer will decrease and his marginal utility of money will increase. Marshall assumed marginal utility of money did not change as a result of the change in price.

4. Introspective Method:

- Another assumption of the cardinal utility analysis is the use of introspective method in observing the behaviour of marginal utility. In this method, the economists reconstruct or build up with the help of their own experience the trend of feeling which goes on in another person's mind. As "introspection is the ability of the observer to reconstruct events which go on in the mind of another person with the help of self-observation. This form of comprehension may be just guesswork or intuition or the result of long-lasting experience."

From the above-mentioned basic assumptions, the creators of cardinal utility analysis have established two laws which occupy a vital place in economic theory and have some applications and uses. These two laws are:

- (1) Law of Diminishing Marginal Utility
- (2) Law of Equimarginal Utility

With the help of these two laws about consumers' behaviour that the exponents of utility analysis have derived the law of demand. Let know about these two laws in detail.

(1) LAW OF DIMINISHING MARGINAL UTILITY

The familiar behaviour of marginal utility has been stated in the law of diminishing marginal utility according to which marginal utility of a good diminishes as an individual consumes more units of the good. It implies that a person takes more units of a good, the extra utility or satisfaction that he derives from an extra unit of the good goes on diminishing. It should be noted that total utility does not decline with the increase in the consumption of a good while marginal utility decreases with the increase in the consumption of a good.

Marshall has given the law of diminishing marginal utility. He stated as follows,

“The additional benefit which a person derives from a given increase of his stock of a thing diminishes with every increase in the stock that he already has.”

This law is based upon two important facts.

1. While the total wants of a man are almost unlimited, each single want is satisfiable. Thus, as an individual consumes more and more units of a good, intensity of his want for the good goes on decreasing and a point is reached where the individual no longer wants any more units of good. That is, when saturation point is reached, marginal utility of a good becomes zero. Zero marginal utility of a good implies that the individual has all that he wants of the good in question.
2. The different goods are not perfect substitutes for each other in the satisfaction of various particular wants. When a person consumes more and more units of a good, the intensity of his particular want for the good decreases but if the units of that good could be devoted to the satisfaction of other wants and yielded much satisfaction as they did initially in the satisfaction of the first want, marginal utility of the good would not decrease.

Assumption of the law:

1. **Cardinal measurement:** it is assumed that utility can be measured, and person can show his satisfaction in quantitative terms.
2. **Monetary measurement:** it is assumed that utility can be measured in terms of money.
3. **Consumption of rational quantity:** it is assumed that rational quantity of commodity is consumed. For instance, if a thirsty person is given water in a spoon, then every additional spoon will give him more utility, compare to glassful water. Thus, to possess true law suitable and proper quantity of the good should be consumed.
4. **Consumption should be in continuous process:** it is assumed that consumption should be in continuous process. For example, if one cup of coffee is consumed in the morning and another in the evening, then second cup of coffee may provide equal or higher satisfaction as compared to the first one.
5. **No change in quality:** it is assumed that there is no change in quality of good consumed. There is uniformity. For example, if second cup of coffee is ‘coffee cappuccino’ then it would give more satisfaction than the first simple cup of coffee. Thus, there should be uniformity.
6. **Rational behaviour:** it is assumed that consumer behaves rationally who measures, calculates, and compares the utilities of different goods and aims at maximizing total satisfaction.
7. **Independent utilities:** it is assumed that all the commodities consumed by a

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consumer are independent. It implies that marginal utility of one commodity is independent with marginal utility of another commodity. It is also assumed that one consumer's utility is not affected by utility of another person.

8. **No change in marginal utility of money:** as a person spends money to buy a good, he is left with lesser money to spend on other commodities. In this process, the remaining money becomes dearer to the person and it increases marginal utility of money for that person. But such as increase in marginal utility of money does not take into consideration. As marginal utility of a commodity has to be measured in the monetary terms, it is assumed that there is no change in marginal utility of money.
9. **Fixed income, price:** it is assumed that income of the consumer and prices of the commodity which he wants to purchase remain fixed.

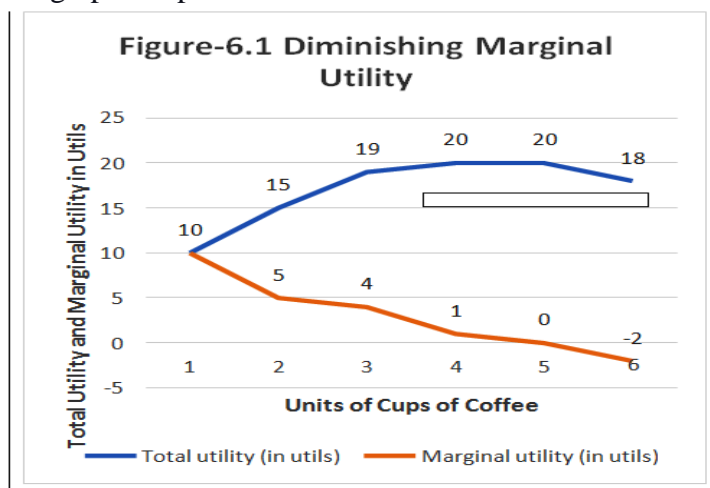
Explanation of the theory:

The following table represents the example of law of diminishing marginal utility in which the total and marginal utilities derived by a person from cups of coffee consumed daily.

Units of cups of coffee	Total utility (in utils)	Marginal utility (in utils)
1	10	10
2	15	5
3	19	4
4	20	1
5	20	0 (point of saturation)
6	18	-2

It is clear from the table -6.2, when one cup of coffee is taken, the total utility derived by a person is 10 utils and due to this is first cup its marginal utility is also 10 utils. With the consumption of second cup, the TU increases to 15 utils but MU decreases to 5 utils. It can be seen from the table that as the consumption of coffee rises to 4 cups MU from the additional cups goes on diminishing and the total utility increasing at a diminishing rate. 5th cup of coffee gives no utility (MU=0), and this is known as point of saturation. Now, if a person consumes another cup of coffee i.e., 6th one, it would give negative utility. MU becomes negative (MU = -2) and total utility also decreases.

This law can also be understood by the following figure. The data of the above table has been used for the graphical presentation of this law.



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- Fig-1 shows nature of the total utility curve and marginal utility curve. It can be seen from the figure TU increases up to the 4th cup of coffee and MU declines, at 5th cup of coffee TU remains constant, it implies that person is not getting utility from 5th cup of coffee therefore MU becomes zero and it is saturation point, at 6th cup of coffee TU declines and MU becomes negative.
- Here, it should be noted that the rate of change in total utility due to change in quantity of commodity consumed is a measure of marginal utility. This marginal utility diminishes with increase in consumption of the commodity. This follows from the law of diminishing marginal utility. Law of Diminishing Marginal Utility states that marginal utility from consuming each additional unit of a commodity declines as its consumption increases, while keeping consumption of other commodities constant. MU becomes zero at a level when TU remains constant. In the example, TU does not change at 5th unit of consumption and therefore $MU_5 = 0$. Thereafter, TU starts falling and MU becomes negative.
- This downward sloping marginal utility curve represents consumer's behaviour regarding demand for goods. Demand curve is derived from the MU curve. The main cause why the demand curves for goods slope downward is the fact of diminishing marginal utility.
- The significance of the diminishing marginal utility law is that the quantity demanded of a good increase as the price decreases and vice versa. It is because of the diminishing marginal utility that the demand curve slope downward.

Applications and uses of law:

1. Explicates value paradox:

- This law helps to explain determination of the prices of goods. The introduction of this concept of marginal utility has helped to explain the paradox of value which bothered Adam Smith in *The Wealth of Nations*. Adam Smith was greatly puzzled to know why water which is so very essential and useful to life has such a low price (indeed no price), while diamonds which are quite unessential, have such a high price. This value paradox is also known as water-diamond paradox.
- Modern economist has solved this paradox with the help of the concept of marginal utility. According to them the total utility of a commodity does not fix the price of a commodity and it is the marginal utility which is very important element of price. Water is available in plentiful quantities so that its relative marginal utility is very low or even zero. Thus, its price is low or zero. On the other hand, the diamonds are rare and therefore their relative marginal utility is quite high, and this is the reason why their prices are high.

2. To derive law of demand:

- By using diminishing marginal utility law, we are able to derive the law of demand and can show why the demand curve slopes downward.

3. Use in the field of fiscal policy:

- Another important use of marginal utility is in the field of fiscal policy. In the modern era, state is welfare state, government redistribute income so as to increase the welfare of the people. This redistribution of income through imposing progressive tax structure, this law demonstrates that transfer of income from the rich person to poor people will increase the economic welfare of the society.

(2) LAW OF EQUIMARGINAL UTILITY:

❖ Introduction:

- To explain consumer's equilibrium, Equimarginal utility occupies important place in marginal utility analysis.
- This law is based on law of diminishing marginal utility. In other words, this law is an extension of diminishing marginal utility.
- This law is also known as law of substitution because for reaching consumer equilibrium consumer substitute one good for another.
- A person has an income which he has to spend on various goods he wants. The question arises that how he would distribute his income among various goods, that it is to say, what would be his equilibrium position regarding purchases of the various goods.
- It is assumed that consumer behaves rationally, i.e., he calculates utilities and substitute one good for another so as to maximize his utility or satisfaction.

❖ Assumption of the law:

1. The wants of a consumer remain unchanged.
2. Consumer has a fixed income.
3. The prices of all goods are given and known to a consumer.
4. He is one of the many buyers in the sense that he is powerless to alter the market price.
5. He can spend his income in small amounts.
6. Consumer behaves rationally in the sense that he wants maximum satisfaction
7. Utility is measured cardinally. This means that utility, or use of a good, can be expressed in terms of "units" or "utils". This utility is not only comparable but also quantifiable.

❖ Explanation:

This law is based upon following two factors. It is assumed that there are two goods 'x' and 'y' on which consumer has to spend his income.

1. Marginal utilities of good 'x' and 'y'
2. The prices of goods 'x' and 'y'.

“The Law of Equi-Marginal Utility states that the consumer will distribute his money income in such a way that the utility derived from the last rupee spent on each good is equal”.

It implies that consumer is in equilibrium position when marginal utility of money expenditure on each good is same. For example, a consumer purchases two goods 'x' and 'y' and prices of goods are PX and PY respectively. If he purchases more of 'x' commodity his MUX decreases and MUY increases. Only at margin the last unit of money spent on 'x' commodity has the same utility as the last unit of money spent on 'y' commodity and the consumer thereby maximizes his satisfaction. This can be true only when consumer will not be distributing his money in purchasing goods 'x' and 'y' since by reallocating his expenditure he cannot increase his total utility. Symbolically, this condition can be written as follows.

$$\frac{MUX}{PX} = \frac{MUY}{PY}$$

Where MUX = Marginal utility of good 'x', MUY = Marginal utility of good 'y', PX = Price of

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good 'x', P_Y = Price of good 'y'.

IF $\frac{MUX}{P_X} \neq \frac{MUY}{P_Y}$ and $\frac{MUX}{P_X} > \frac{MUY}{P_Y}$ then consumer will substitute good 'x' for good 'y'.

consequently, the marginal utility of good 'x' will decrease, and marginal utility of good 'y' will increase.

- The Consumer will continue substituting good 'x' for good 'y' till $\frac{MUX}{P_X} = \frac{MUY}{P_Y}$.
- When $\frac{MUX}{P_X} = \frac{MUY}{P_Y}$ consumer is in equilibrium position. But this equality condition can be obtained at one level as well as different level. This is fixed by the size of his money expenditure. With a given expenditure on a good, the consumer will derive some utility from it.
- Now, person will go on purchasing goods till the marginal utility of money expenditure on each good becomes equal. It is expressed by following equation.

$$\frac{MUX}{P_X} = \frac{MUY}{P_Y} = MUM, \text{ here } MUM \text{ is the marginal utility of money expenditure.}$$

- Law of Equimarginal utility can be illustrated by the following tables.

Marginal Utility of Good 'X' and good 'Y'			Marginal Utility of Money Expenditure	
Units	MUX (in utils)	MUY (in utils)	$\frac{MUX}{P_X}$ (Price of good 'x' = 2)	$\frac{MUY}{P_Y}$ (Price of good 'y' = 3)
1	20	24	10	8
2	18	21	9	7
3	16	18	8	6
4	14	15	7	5
5	12	12	6	4
6	10	9	5	3

- The above-mentioned table shows marginal utility of good 'x' and 'y' and marginal utility of money expenditure. It should be noted that in order to maximize utility the consumer will notequate marginal utility of goods because prices of the two goods are different. Consumer will equate the marginal utility of the last rupee (i.e., marginal utility of money expenditure spent

On these tow goods or we can say $\frac{MUX}{P_X} = \frac{MUY}{P_Y}$ while spending his given income on these two goods. Suppose consumer has Rs. 24 to spend on the two goods, and price of good 'x' is Rs. 2, price of good 'y' is Rs. 3.

- ❖ It is clear from the table ($\frac{MUX}{P_X} = 5$) when consumer purchase 6 units of good 'x'
- ❖ $\frac{MUY}{P_Y} = 5$) when consumer purchase 4 units of good 'y'
- ❖ Thus, consumer is in equilibrium when he purchases 6 units of good 'x' and 4 units of good 'y' and will spend Rs. 2 for 6 units of good 'x' (i.e., $2*6 = 12$), Rs. 3 for 4 units

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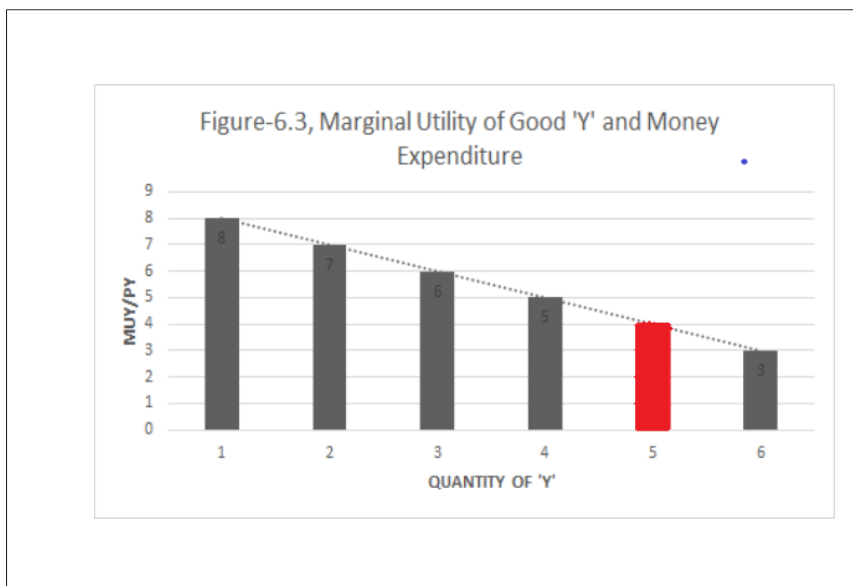
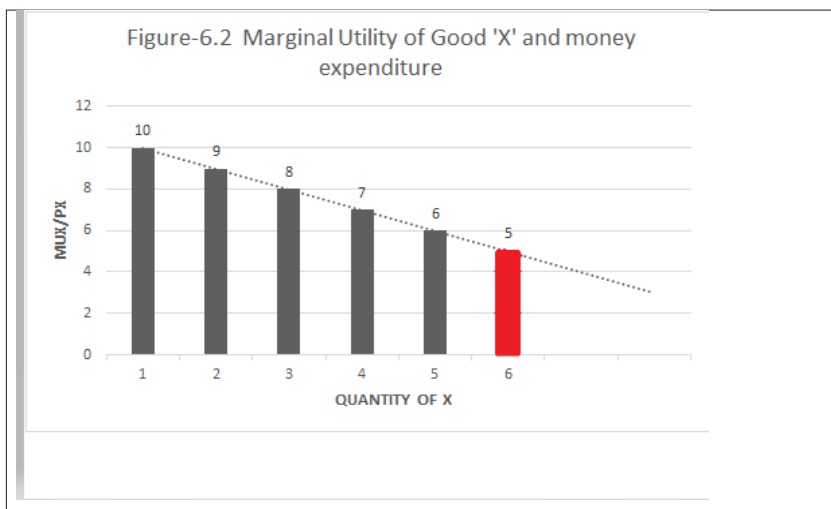
of good 'y' (i.e., $3 \times 4 = 12$) and Rs. $(12+12) = 24$ on them.

❖ Therefore, consumer's equilibrium position is as follows.

❖ $\frac{MUX}{PX} = \frac{MUY}{PY} = MUM$

❖ $\frac{10}{2} = \frac{15}{3} = 5$

- Thus, 5 is the marginal utility of the last rupee spent on each of the two goods he buys is the same, i.e., Rs. 5.
- This law can also be explained with the help of the following figure.



- The above figure 6.2 and 6.3 represent marginal utilities of goods 'x' and 'y'. Marginal utility Per rupee spent on good X = $\frac{MUX}{PX}$ and that of Y = $\frac{MUY}{PY}$. Since marginal utility curves of the good slope downward as shown in figures 6.3 and 6.4
- Thus, consumer in equilibrium when he is buying 6 units of good 'x' and 4 units of

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good 'y'. No other allocating of money expenditure will give greater utility.

- For example, if the consumer purchases one unit less of good 'x' and one unit more of good 'y'. It will lead to decline in his total utility. It can be seen from the figure 6.3 that the consumption of 5 units instead of 6 units of commodity 'x' will result in a loss of satisfaction and consumption of 5 units of good 'y' instead of 4 units will result in a gain of satisfaction.
- Thus, when the consumer is purchasing by spending his given income in such a way that $\frac{MUX}{PX} = \frac{MUY}{PY}$, he would not prefer to make any further changes and will therefore be in equilibrium situation by maximizing his utility

❖ **Equimarginal conditions for consumer's equilibrium:**

1. A consumer is in equilibrium when he equalises the ratios of marginal utilities of goods and their prices with each other.

$$\frac{MUX}{PX} = \frac{MUY}{PY} = \frac{MUN}{PN} = MU_n$$

Rearrange the above equation, when consumer equalizes the ratio of marginal utilities of goods and their prices for each pair of goods consumed, that is when $\frac{MUX}{PX} = \frac{MUY}{PY}$

2. Since $\frac{MUX}{PX}$ Or $\frac{MUY}{PY}$ measures the marginal utility of a rupee's worth of each good consumed at given price, consumer is in equilibrium when the marginal utility of the last rupee spent on each good purchased is equal. The marginal utility of the last rupee spent on each good is indicated by MU_m . Thus, equilibrium condition of consumer's equilibrium is stated as under.

$$\frac{MUX}{PX} = \frac{MUY}{PY} = MU_m$$

❖ **Limitations of the law of Equimarginal Utility:**

1. **Consumer's habits and customs:** To apply law of Equimarginal utility in actual life, consumer must consider in his mind the marginal utilities of different commodities. So, he can calculate and compare the marginal utilities received from different commodities. But it is seen that the laymen are not so rational and calculating. Consumers are usually ruled by habits and customs. Because of their habits and customs, they purchase particular amounts of different commodities, irrespective of whether particular distribution maximizes their satisfaction or not.
2. **Cardinal Measurements:** According to this law, the consumer must be able to measure the marginal utilities of different commodities in cardinal terms. But it is not possible for the consumer to measure the utility cardinally. Prof. J. R. Hicks and R. G. D. Allen explained ordinal utility analysis which involves the use of indifference curves.
3. **Indivisibility of Goods:** Goods are available in large indivisible units. It is not possible to equate the marginal utility of money spent on them. For example, in distributing money between the purchase of vehicles and food grains, marginal utilities cannot be equated. Because vehicle is indivisible, whereas food grains are divisible. Thus, marginal utility of rupee obtained from vehicle cannot be equalised with obtained from food grains.

❖ **Critical Evaluation of Marshall's Cardinal Utility Analysis:**

- 1. Unrealistic Assumption of Cardinal Measurement:** cardinal utility analysis of demand based upon the assumption of cardinal measurement, it means that utility can be measured in absolute term, objectively, and quantitatively. According to this law, consumer can express his utility in cardinal numbers such as 1, 2, 3, 4 and so forth. But in actuality utility cannot be measured in such cardinal terms. Because utility is subjective in nature so it cannot be measured in quantitative terms. Consumer can only compare the satisfaction obtained from different goods or combinations of goods. Thus, economist like J.R. Hicks criticized the assumption of cardinal measurability of utility.
- 2. Unrealistic hypothesis of independent utilities:** this utility analysis assumed that utilities obtained from various goods are independent. It implies that utility which a consumer obtains from a good is the function of the quantity of that good and of that good alone. It means that the utility derives from a good does not depend on the quantity consumed of other goods; it depends upon quantity purchased of that good alone. Neoclassical economists such as Jevons, Menger, Walras measured that utility functions were additive. But in actual life utility or satisfaction derived from a good depends upon the availability of some other goods that can be substitute or complement. Various goods are related with each other. Therefore, the hypothesis of independent utilities are unrealistic.
- 3. Invalid assumption of fixed cardinal utility of money: of money is bound to fall. This is indeed a serious defect of utility analysis.** In debating the effect of a change in price increase or decrease on the amount demanded by an individual consumer, the Utility Analysis assumes that the marginal utility of money remains constant. As a consumer spends his money income on the goods, money income left with him declines. And with this decline in money income of the consumer as a result of increase in his expenditure on goods, the marginal utility of money to him increases. When the price of a good changes, the real income of the consumer also changes. With this change in actual income, marginal utility of money will change. The utility analysis supervises the fact that a fall in the price of a commodity itself releases some money and therefore the marginal utility of money cannot remain constant. With more money becoming available to the consumer, the marginal utility of money is bound to fall. This is certainly a serious limitation of utility analysis.
- 4. Marshall's cardinal utility analysis based upon one commodity case:** J.R. Hicks further criticized the Marshallian utility analysis on the ground of one commodity model. This theorem cannot be applied in a case when a consumer spends his money on more than one good. The marginal utility of money cannot be assumed to remain fixed when the consumer has to spend his money income on a number of goods. In the case of many goods, Marshall's analysis cannot be genuinely derived while keeping marginal utility of money constant. If marginal utility of money is assumed to be constant, it will no longer provide measuring rod, and we can no longer express the marginal utility of commodity in units of money.
- 5. Ignorance of substitution and income effects under price effect:** Another criticism of the cardinal utility analysis is that it does not differentiate between the income effect and the substitution effect of the price change. Marshall and other exponents of cardinal utility analysis has ignored income effect of the price change by assuming the constancy of marginal utility of money. In actual life, when the price of a good

decreases, the consumer becomes better off than before, that is, a decrease in price of a good brings about an increase in the real income of the consumer. With this income he would be in a position to purchase more of this good as well as other goods. This is the income effect of the fall in price on the quantity demanded of a good. Besides, when the price of a good decreases, it becomes relatively cheaper than other goods and as a result the consumer is induced to substitute that good for others. This result is increase in quantity demanded of that good. This is the substitution effect of the price change on the quantity demanded of the good. Thus, total effect of price can be decomposed into substitution effect and income effect.

6. **No explanation of Giffen Paradox:** By not considering the price effect as a combination of substitution and income effects and disregarding the income effect of the price change, Marshall could not explain the Giffen Paradox. He treated it just as an exception to his law of demand. On the contrary, indifference curve analysis has been able to explain satisfactorily the Giffen good case. According to indifference curve analysis, in case of a Giffen Paradox or the Giffen good, negative income effect of the price change is more powerful than substitution effect so that when the price of a Giffen good falls, the negative income effect outweighs the substitution effect with the result that quantity demanded of it falls. Therefore, assuming constant marginal utility of money and therefore the ignorance of income effect of price change that Marshall could not explain why the quantity demanded of a Giffen good decreases when its price decreases, and increases when its price increases. This is a serious defect in Marshallian Utility analysis of demand.

Due to above criticisms, cardinal utility analysis has been handed over in modern economic theory and demand is analysed with indifference curves which is known as ordinal utility theory. Let discuss ordinal utility theory

6.3 THE ORDINAL UTILITY THEORY:

❖ Introduction:

- Ordinal utility approach is also known as *Indifference Curve Analysis* or *Hicksian Analysis*.
- The technique of indifference curve was first of all introduced by classical economist Edgeworth.
- The real elaboration of the indifference curve was made by J. R. Hicks and R.G.D. Allen. They criticized Marshall's utility analysis based upon cardinal measurement of utility in their paper 'Reconsideration of the theory of value' and introduced indifference curve approach based upon the concept of ordinal utility to explain consumer's behaviour.
- According to them, a consumer can rank various combinations of goods and services in order of his preference.
- Ordinal Approach assumes that a consumer cannot measure the satisfaction that he/she obtained from the consumption of a particular good or service. Further, it states that measurement of satisfaction in specific units is not required. In fact, a consumer ranks different goods and services as per his/her preferences. In other words, it states that a consumer takes his consumption decisions on the basis of the ranks allotted in order of his/her preferences.
- For example, there are various combinations such as A, B, C, D, E etc. the consumer can express whether he prefers A to B, or B to A, or is indifferent between them. In other words, if consumer consumes apple and banana, then he can show: -
 1. Whether he prefer apple over banana or

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2. Whether he prefer banana over apple
3. Whether he is indifferent between apple and banana.

❖ Assumptions of the theory:

The general assumptions made about the preferences of consumer for the goods are as follows.

1. **Taste and preferences:** a consumer's preferences for his consumption bundle depends on his tastes and preferences for various goods.
2. **Rationality:** it is assumed that consumer behaves rationally. The only motive of consumer is to maximise the level of satisfaction. Thus, the consumer will always prefer best combination of goods among all the available combinations of goods.
3. **Well- defined preferences:** a consumer is assumed to have well-defined for all the possible combinations, i.e., the consumer accurately knows his choice and preferences.
4. **Comparison:** a consumer can compare any two consumption combinations and can accordingly either prefer one consumption combination over another consumption combination or be indifferent towards both.
5. **Ranking:** it is assumed that a consumer can rank the other consumption combination in order of their preferences. It means consumer can rank the consumption combination from the most preferred ones to least preferred ones. However, if there are various combination of commodities available than consumer can give rank to them. Consumer remains indifferent between them.
6. **Diminishing Marginal Rate of Substitution:** This theory is based upon diminishing marginal rate of substitution. It acts as a vital concept in ordinal theory analysis. Marginal rate of substitution means the rate at which a consumer is willing to substitute one good (X) for another good (Y), so that the total satisfaction remains the same.

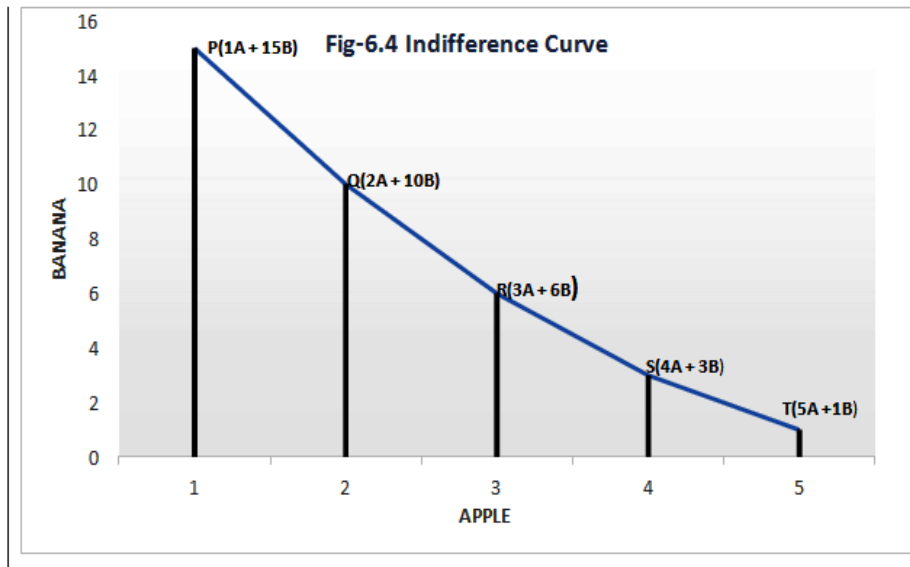
❖ Meaning of Indifference Curve:

- Indifference curve is the basic tool of Hicks-Allen ordinal analysis of demand.
- *Indifference curves represent all those combinations of goods which give equal satisfaction to the consumer, he will be indifferent between them, that is, it will not matter to him which one he gets.*
- All combinations of the goods lying on a consumer's indifference curve are equally desirable or equally preferred by him.
- This can be illustrated by the following table 6.4 and figure 6.5.

Table 6.4 Indifference Curve Schedule		
Apple	Banana	Combination points of Apple and Banana
1	15	P (1A + 15B)
2	10	Q (2A + 10B)
3	6	R (3A + 6B)
4	3	S (4A + 3B)
5	1	T (5A + 1B)

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The table 6.4 shows indifference curve schedule in which amounts of apple and banana has been taken and in each combination consumer is indifferent. In this schedule, consumer consumes 1 unit of apple and 15 units of banana. Now, if consumer asked to say how much unit of banana, he will be ready to give up for the gain of additional unit of apple so that his level of satisfaction remain same. Consumer can choose any combination to given him and his level of satisfaction will remain same. He will be indifferent among the combination. This can also be explained in following figure 6.4.

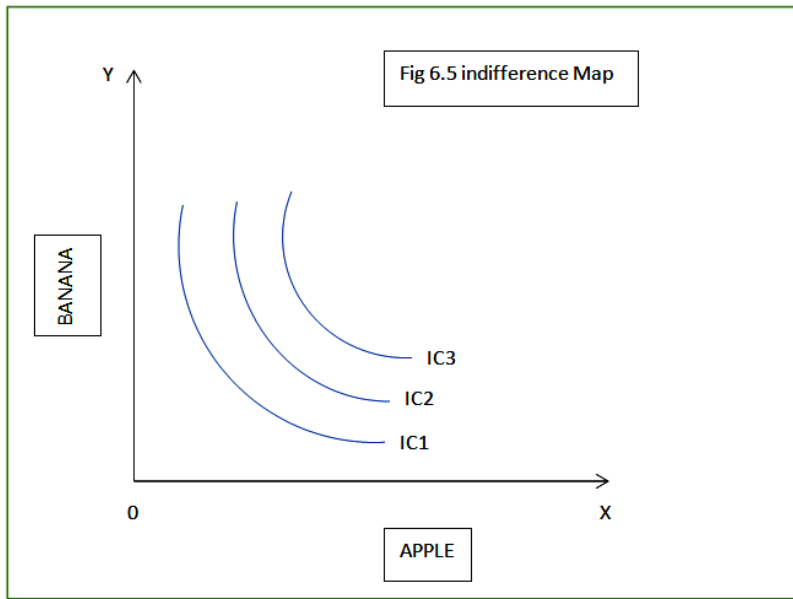


In fig. 6.4 an indifference curve is drawn by the various combination such as P, Q, R, S, and T of the indifference schedule. The quantity of apple has been measured on horizontal axis, and the quantity of banana has been measured on vertical axis. As in an indifference schedule, combination lying on the indifference curve will also be equally preferable to the consumer, that is, it will give him the equal satisfaction. He can choose any combination. It should be noted that while an indifference curve represents all these combinations of two goods which gives equal satisfaction to the consumer, it does not indicate exactly how much satisfaction is derived by the consumer from these combinations. Because this concept of ordinal utility does not involve the quantitative measurability of utility.

❖ Indifference Map:

- Indifference map consists a set of indifference curves.
- A complete description of consumer's taste and preferences can be measured by indifference map.
- The field of two-dimensional diagram includes an infinite number of points each presenting a combination of two goods.
- The indifference map has been shown in the following figure 6.5.

Figure 6.5



- In above figure 6.5 an indifference map consists of three indifference curves IC1, IC2 and IC3.
- All combination on indifference curve IC1 will give equal satisfaction to consumer. Similarly, combinations lying on IC2 and IC3 will give same satisfaction but the level of satisfaction on IC2 will be higher than IC1 and at IC3 will be higher than IC2, IC1. Thus, all the higher indifference curves represent progressive higher and higher level of satisfaction.
- Consumer can prefer any combination on a higher indifference curve to any combination on a lower indifference curve, but how much he prefers one combination to another it cannot be known.
- In brief, higher indifference curve represent a higher level of satisfaction than a lower indifference curve but ‘how much’ cannot be indicated. This is because the indifference curve analysis is based upon the concept of ordinal utility.

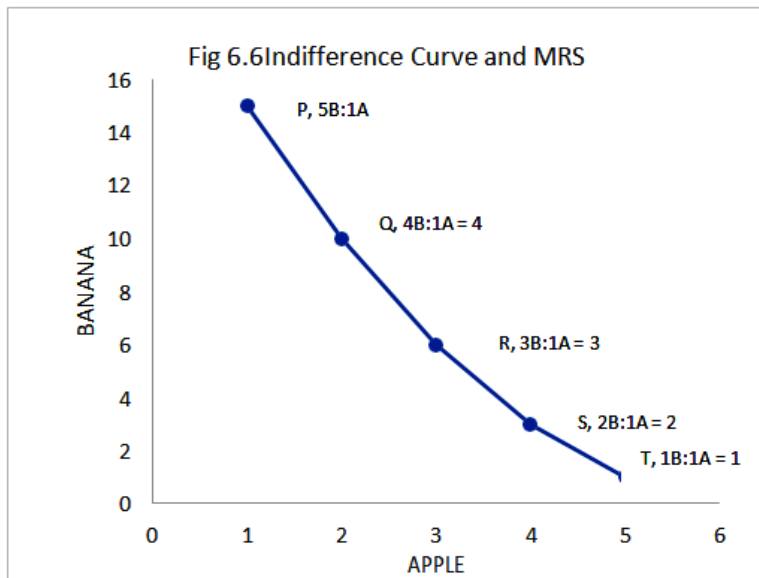
❖ **Marginal Rate of Substitution (MRS):**

- Marginal rate of substitution is an important tool of indifference curve analysis of demand.
- This is rate at which the consumer is ready to exchange one goods to another goods. And the total satisfaction of the consumer remains same.
- We take the example of apple and banana, apple denotes ‘A’ banana denotes ‘B’ then the marginal rate of substitution of A for B is the amount of B whose loss can just compensated by a unit gain in A. In brief, marginal rate of substitution of A for B represents the amount of B which the consumer has to give up for the gain of one additional unit of A so that his level of satisfaction remains the same.
- Thus, marginal rate of substitution A for B (MRS_{ab}) = Change in B / Change in A.
- $MRS_{ab} = \frac{\Delta A}{\Delta B}$
- The marginal rate of substitution can also be understood by the following table 6.5.

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Table 6.5. Indifference Schedule Marginal Rate of Substitution			
Combination	Apple (A)	Banana (B)	$MRS_{ab} = \frac{\Delta B}{\Delta A}$
P	1	15	-
Q	2	10	$\frac{5B}{1A} = 5$
R	3	6	$\frac{4B}{1A} = 4$
S	4	3	$\frac{3B}{1A} = 3$
T	5	1	$\frac{2B}{1A} = 2$

- It is seen in above table 6.5, in the beginning the consumer gives up 5 units of banana for the gain of one additional unit of apple and in this process his level of satisfaction remains the same. It means marginal rate of substitution of A for B is 5.
- In table 6.5 when the consumer moves from combination Q to R, he forgoes 4 units of banana for additional one unit gain in A. Thus, marginal rate of substitution of A for B is 4. Likewise, when consumer moves from R to S, and then S to T, the marginal rate of substitution of A for B is 3 and 2 respectively.
- The diminishing marginal rate of substitution is illustrated by the following figure 6.6.



it is clear from the above figure that the significance of Apple (A) in terms of Banana (B) goes on diminishing with each addition of apple, when the consumer moves downwards along the indifference curve, he obtains more of A and less of B. The amount of B, he is ready to give up to get additional unit of A becomes smaller and smaller. The marginal rate of substitution A for B is, in fact, the slope of curve at a point on the indifference curve such as points P, Q, R, S, and T.

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thus, $MRS_{ab} = \frac{\Delta B}{\Delta A}$

❖ Properties of Indifference Curve:

The following assumptions have been made for indifference curve analysis.

1. **Rationality:** We have assumed our consumer a rational consumer he always aims at getting the maximum satisfaction (utility) out of his income taking the prices and other relevant information into account.
2. **Two commodities:** at any given point of time consumer has only two commodities in his consumption basket.
3. **Ordinality:** it is not possible to quantify utility availed from the consumption rather the consumer is able to rank his preference.
4. **Satiety:** satiety means full satisfaction. The consumer is never completely satisfied. This is in accordance to the assumption on no satiation. In other words, more is always wanted.
5. **Consistent:** the consumer is consistent in his choices. This implies that if a consumer is indifferent between available goods.
6. **Continuity:** the two goods under consideration are perfectly divisible in small units. This implies that indifference curves are continuous in nature.

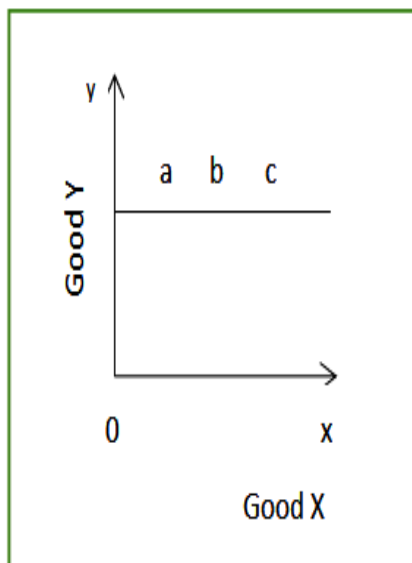
❖ Properties:

1. Indifference curves are downward slopping:

It implies that indifference curve has negative slope and it downwards from left to right. This property is based on the assumption that if a consumer uses more quantity of one good, he has to reduce the consumption of other good in order to stay at the same level of satisfaction.

(1) If the indifference curve had the shape of horizontal line as shown in following figure.

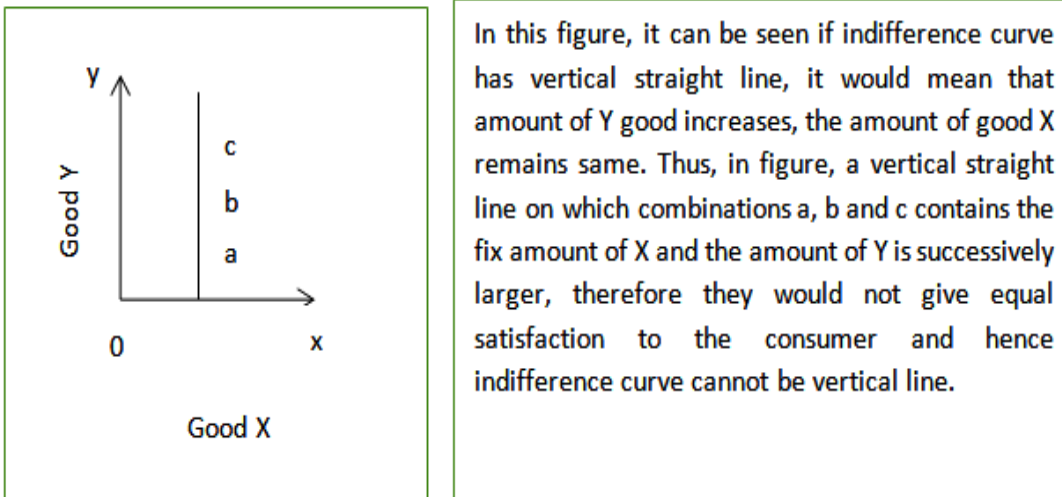
Figure 6.7



In this figure, we can see that as the amount of good X increased but there is no change in Y, the consumer remains indifferent as between various combinations. But this cannot be true if we apply our assumption. According to assumption, consumer always prefer a larger amount of a commodity to the smaller amount of it, other things being given. In figure various combinations such as a, b, and c on indifference curve while the amount of x is larger and there is no change in Y. if consumer prefer larger amount of X, he cannot be indifferent between combinations. Thus, indifference curve cannot be horizontal line.

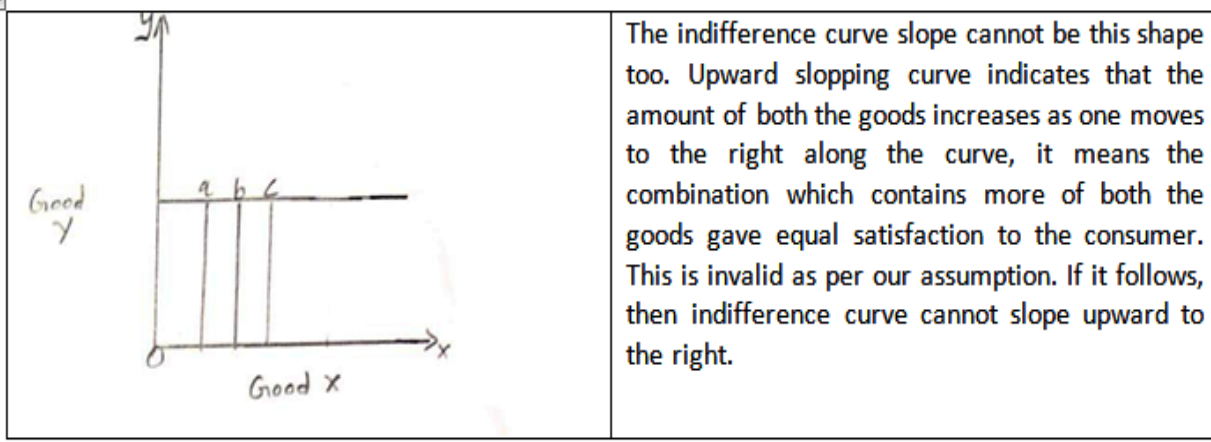
If the indifference curve had the shape of vertical line as shown in following figure.

Figure 6.8



(3) If the indifference curve slope upward to the right.

Figure 6.9

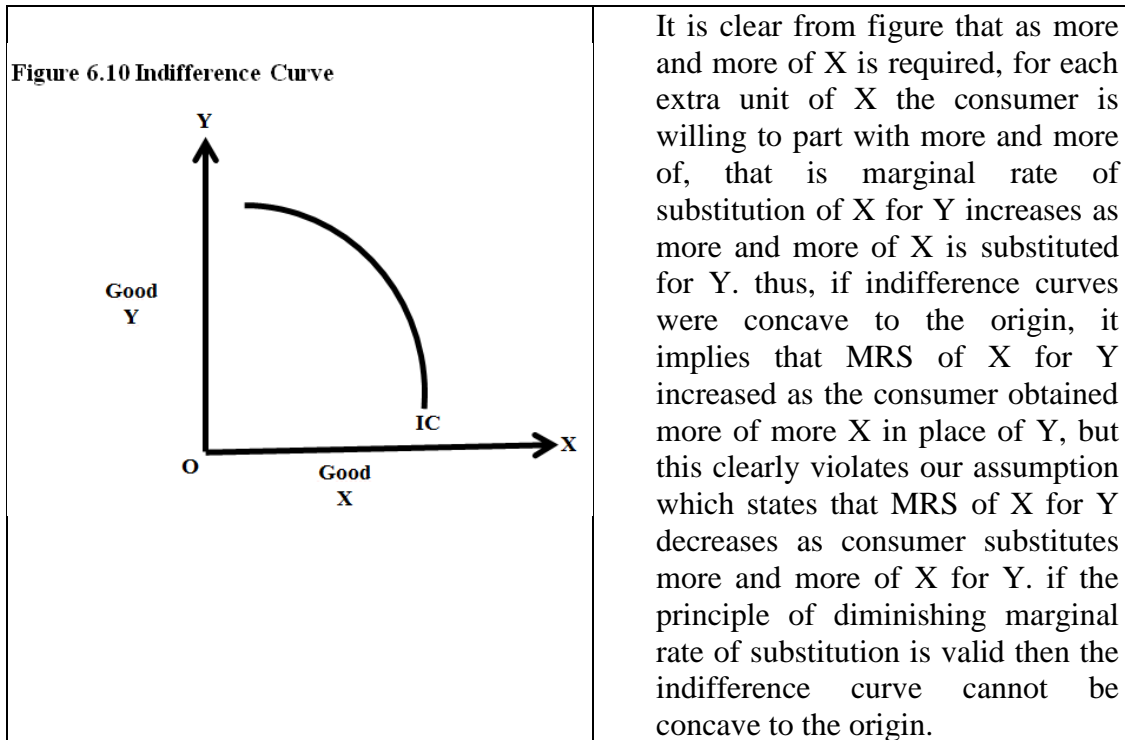


Thus, indifference curve slope downward to the right.

2. Indifference curves are convex to the origin:

This property is based on the principle of Diminishing Marginal Rate of Substitution. It means that as the units of 'X' are increased by equal amounts, the 'Y' diminishes by smaller and smaller amounts. This happens because as a consumer gets more and more units of 'X' good, he is willing to give up less and less units of good Y for each extra unit of X. only a convex indifference curve can mean a diminishing marginal rate of substitution.

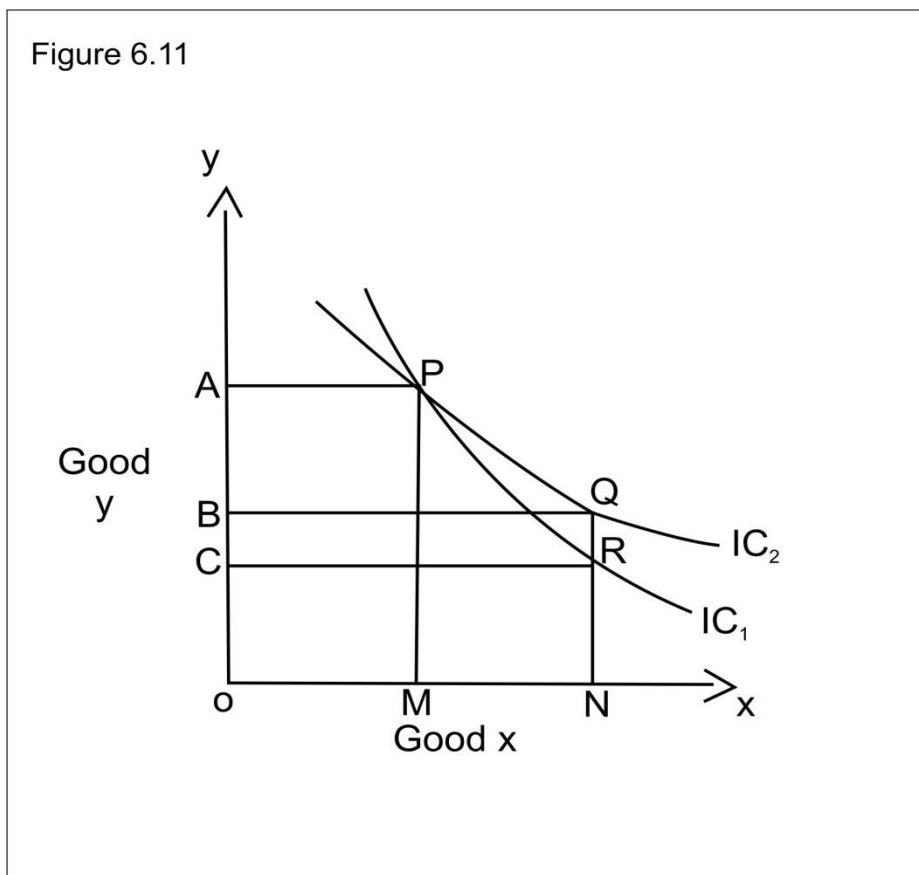
(1) If the indifference curve concave to the origin: - it implies that MRS of X for Y increased as more and more of X is substituted for Y as shown in following figure.



Thus, indifference curves are convex to origin.

3. Indifference curves cannot intersect each other.

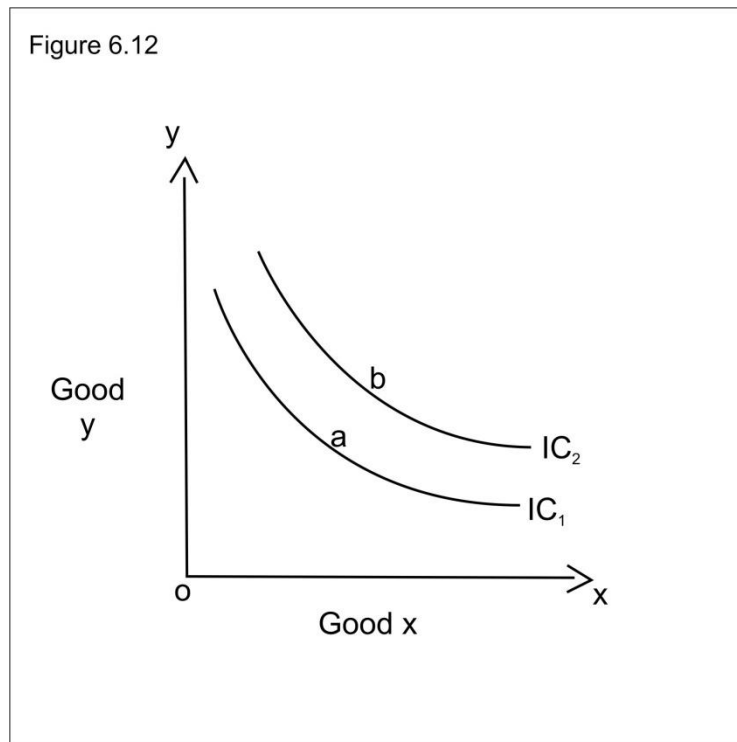
It implies that only one indifference curve will pass through a point in the indifference map. This property has been proved with the help of following diagram.



CONSUMPTION AND INVESTMENT FUNCTION

- In the above figure we can see that indifference curve are cutting each other at point P. Since indifference curve shows those combinations of two commodities which provides equal satisfaction to the consumer, the combinations indicated by points P and Q will give same satisfaction to the consumer because both lie on the same indifference curve IC2.
 - Similarly, the combinations R and P will provide same satisfaction to the consumer because both points lie on the same indifference curve IC1.
 - If combination Q is equal to combination P in terms of satisfaction, and combination R is equal to P, it follows that the combination Q will be equivalent to R in terms of satisfaction. If we see in the figure, combination Q contains more of good Y than combination R, while the amount of X is equal in both combinations.
 - Thus, consumer will prefer Q to R, that is, Q will give more satisfaction to the consumer than R. but the two indifference curves cutting each other lead us to an irrational conclusion of Q being equal to R in terms of satisfaction. So, it can be concluded that two indifference curves cannot cut each other.
- 4. Higher indifference curve represents a higher level of satisfaction than a lower indifference curve.**

This property indicates that the combinations which lie on a higher indifference curve is preferred to the combinations which lie on a lower indifference curve. It has been explained with the help of following figure.



- In the figure IC2 is higher indifference curve than IC1. Combination b is taken on higher indifference curve IC2 and combination a is taken on a lower indifference curve. Combination b will give more satisfaction than combination a to the consumer.
- Combination b contains more of both goods X and Y than the combination a.
- Hence, according to assumption consumer must prefer combination b.
- Thus, higher indifference curve represents higher satisfaction.

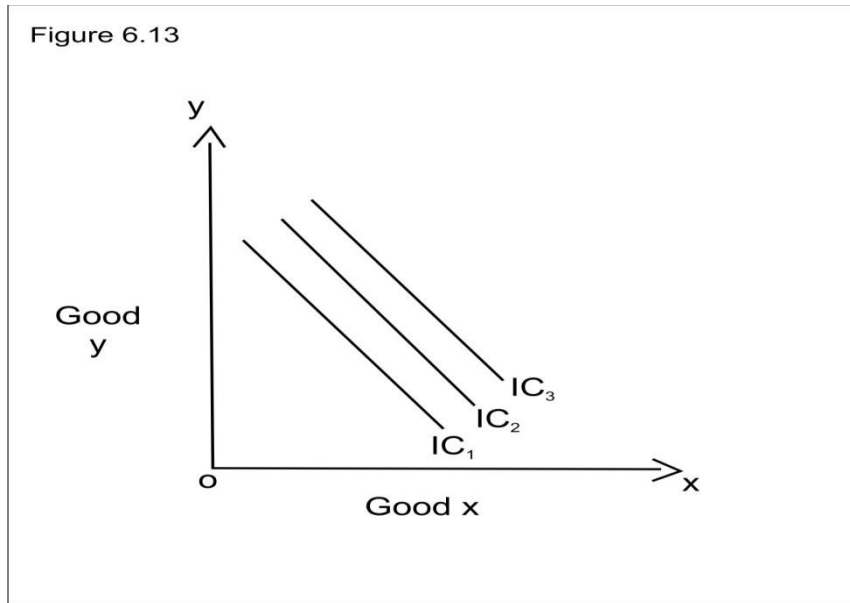
❖ Indifference curves of Perfect Substitute and Perfect Complements:

- The degree of convexity of an indifference curve based upon the rate of fall in the MRS of X

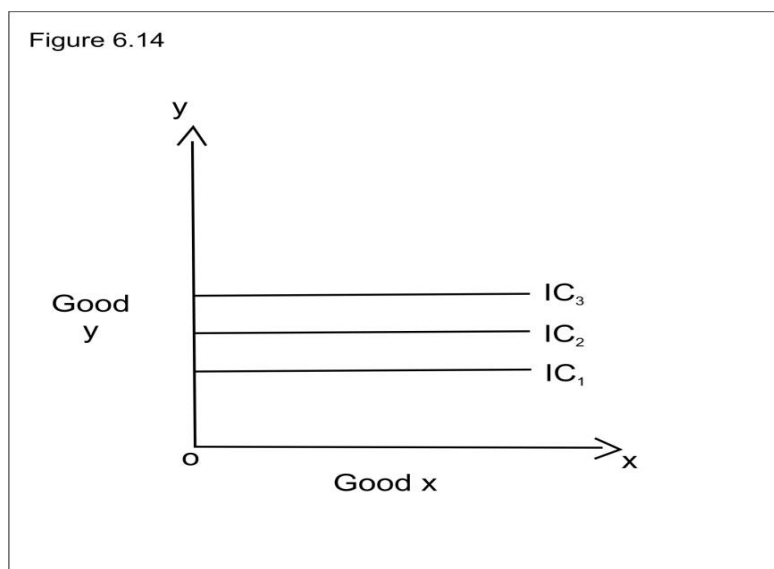
CONSUMPTION AND INVESTMENT FUNCTION

for Y.

- It has been stated that when two goods are perfect substitutes of each other, the indifference curve is a straight line on which MRS remains constant.
- Straight line indifference curves of perfect substitute have been shown in the following figure.



- In case of perfect substitutes, the indifference curves are parallel straight lines. It is because of the consumer equally prefers the two goods and is ready to one good for the other at a fixed rate.
- Marginal rate of substitution of one good for another remains constant. For example, two different brands of soap such as Lux and Santoor.
- The greater the fall in MRS, the greater the convexity of the indifference curve.
- The following figure shows indifference curve of the perfect complementary goods.



- Indifference curves of the perfectly complementary goods is a vertical straight line which shows that an infinite amount of Y is necessary to substitute one unit of X.

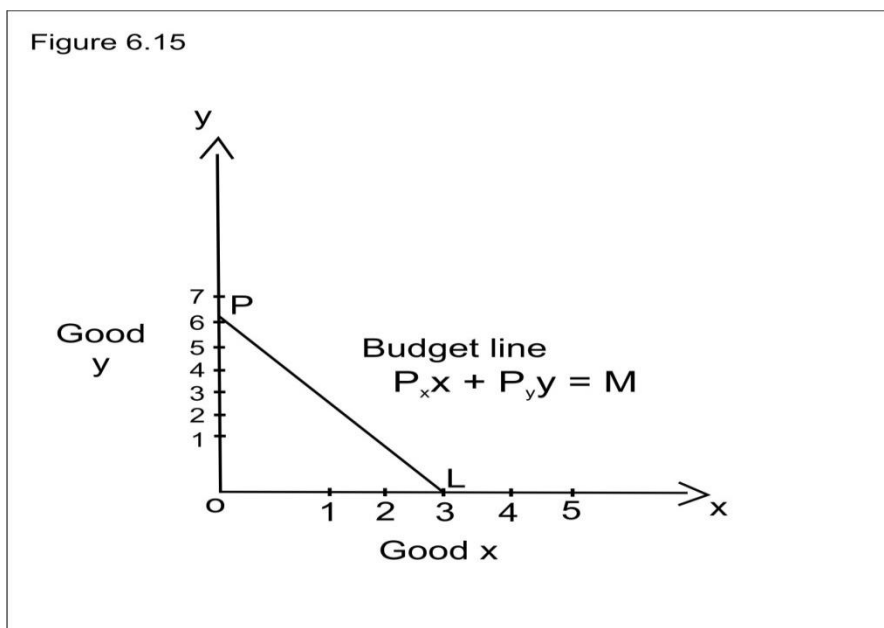
CONSUMPTION AND INVESTMENT FUNCTION

- Two perfect complements are used in a certain fixed ratio and cannot be substituted for each other.
- In figure, two perfect complements are consumed. Complements are therefore those goods which are used jointly in consumption so that their consumption increases or decrease simultaneously. Pen and ink, petrol and vehicle etc. are the example of complementary goods.

To understand the theory of consumer's equilibrium, it is essential to know about the concept of budget line.

BUDGET LINE:

- Budget line is also known as price line.
- As explained earlier, higher indifference curve represents a higher level of satisfaction than a lower one.
- Thus, consumer tries to maximise his satisfaction by reaching the highest possible indifference curve.
- But for having more goods, he will have to purchase more goods thus obtaining more and more satisfaction he has to work under two constraints.
 1. To pay the price
 2. Limited money income.
- As explained above, indifference map shows consumer's scale for preference between two goods.
- Now to achieve consumer equilibrium, it is needed to introduce into indifference figure the budget line which represents the prices of goods and consumer's money income.
- For example, consumer has Rs. 60 to spend on good X and Y. the price of good X in the market is Rs. 20 per unit and Rs. 10 per unit of Y.
- If the consumer spends his whole income of Rs.60 on good X, he will purchase 3 units of X.
- If the consumer spends his whole income of Rs.60 on good Y, he will purchase 6 units of Y.
- The following figure shows budget line.



- It is seen in figure, when we joint 3X and 6Y, we get price line or the budget line. This budget line represents all the combination of two goods on which the consumer can spend his money income.

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- Consumer can buy any combination that lies on budget line with his given money income and given prices of goods.
- It is noted that any combination of goods which lies above and outside the given budget line will be beyond the reach of the consumer.
- Any combination which lies within the budget line will be within the reach of the consumer.
- Thus, according to assumption that whole of the given income is spent on the given goods at given prices of them, the consumer must choose from all combinations which lie on the budget line.
- It is important to know that the intercept OP on the OY-axis in figure equals the amount of his entire income divided by price of commodity Y. similarly, the intercept OL on the OX-axis measures the total income divided by the price of commodity X.
- The budget line or price line equation can be written as follows.
 $P_xX + P_yY = M$
Where, P_x and P_y = price of good X and Y respectively and M = money income.
- This equation clears that given the money income of the consumer and price of two goods, every combination lying on the price line or budget line will cost the same amount of money and can therefore be purchased with the given income.
- **Thus, budget line or price line can be defined as a set of combinations of two commodities that can be purchased if whole of a given income is spent on them and its slope is equal to the negative of the price ratio.**

Slope of budget line and prices of two goods:

- The slope of the budget line is equal to the ratio of the prices of two goods.
- Assuming that the given income of the consumer is M , and the given prices of goods X and Y are P_x and P_y respectively.
- The slope of budget line or price line is OP/OL which is equal to the ratio of the price of goods X and Y.

❖ **PROVE:**

- The amount of good X purchased if whole of the given income M is spent on it is OL .
Therefore, $OL \times P_x = M$.
 $OL = M/P_x \dots (i)$
- The amount of good Y purchased if whole of the given income M is spent on OL .
Therefore, $OP \times P_y = M$.
 $OP = M/P_y \dots (ii)$
- Dividing (ii) by (i)
 $OP/OL = M/P_y \div M/P_x = M/P_y \times P_x/M = P_x/P_y$
Thus, slope of budget line = $OP/OL = P_x/P_y$.

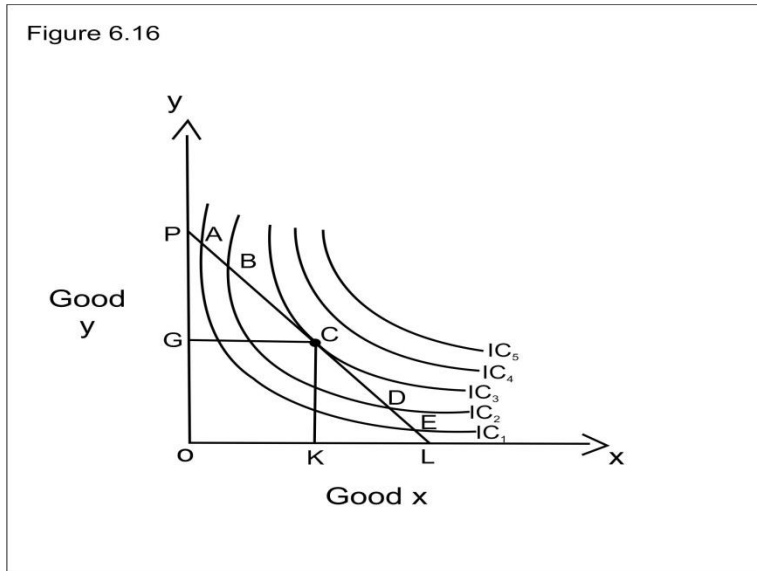
❖ **Consumer Equilibrium:**

- Consumer equilibrium indicates optimum choice of the consumer. It is reached when consumer maximises his utility/satisfaction.
- According to indifference curve analysis, the consumer achieves his optimum choice when two conditions are satisfied.

CONSUMPTION AND INVESTMENT FUNCTION

1. $MRS_{xy} = P_x/P_y$, where MRS_{xy} shows slope of indifference curve and P_x/P_y shows slope of budget line or price line. So that equilibrium can be achieved if indifference curve and price line are tangent to each other.
2. Indifference curve is convex to the origin at the point of equilibrium.

- **Briefly, when indifference curve and price line intersect each other, this is known as consumer equilibrium.**
- The consumer equilibrium is explained with the help of following figure.



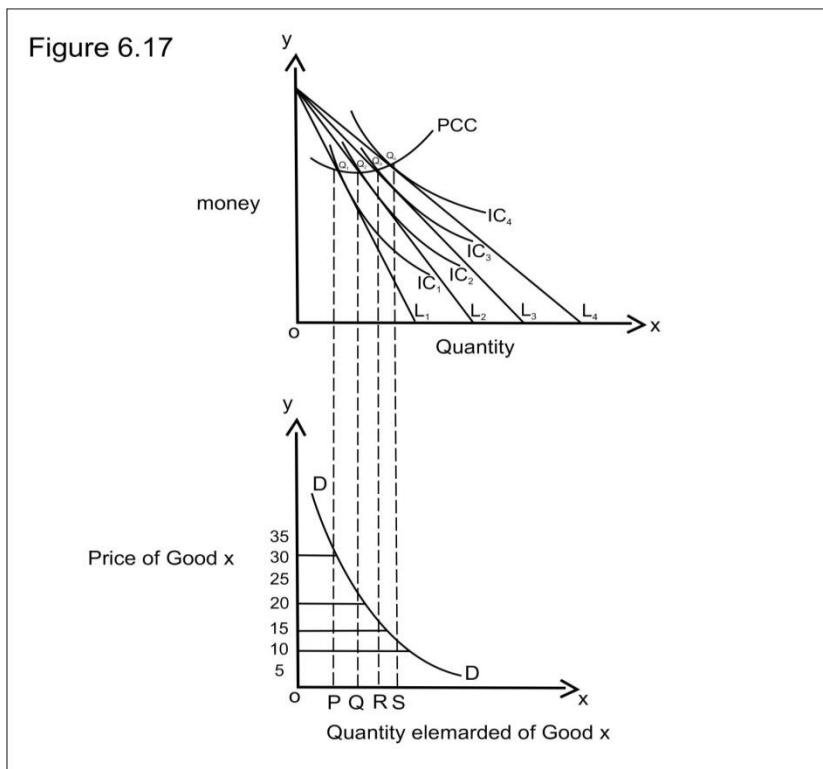
- In figure 6.16 good X is measured on the OX-axis and good Y is measured on OY-axis. The consumer can buy any combination of the goods which lies on the price line or budget line PL. every combination on the price line PL costs him the equal amount of money. IC1, IC2, IC3, IC4 and IC5 are indifference curves.
- To maximize his satisfaction the consumer will try to reach the highest possible indifference curve. Budget constraints forces the consumer to remain on the given price line, means, to choose a combination from among those which lie on the given price line.
- It is seen in the figure that the various combinations of the two goods (Good X and Good Y) lying on the price line and therefore the consumer can afford to purchase do not lie on the same indifference curve; they lie on different indifference curves.
- The consumer chooses that combination on the price line PL which lies on the highest possible indifference curve. The consumer can reach the indifference curve to which the price line PL is tangent.
- In figure price line PL is tangent to indifference curve IC3 at point C. indifference curves are convex to the origin, all other points on the price line PL, above or below the point C, will lie on lower indifference curve.
- At point A which also lies on the price line and which the consumer can afford to buy and cost him the same as the combination C. but, it can be seen point A lies on lower indifference curve IC1 and will therefore give less satisfaction than C.
- Similarly, point B also lies on the price line PL but it is also rejected in favour of C because it is also lie on lower indifference curve IC2.

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- Point C will be preferred among all other points lie on the price line PL.
- Thus, it implies that of all possible combinations lying on price line PL, combination C lies on the highest possible indifference curve IC3 which gives maximum possible satisfaction.
- Combinations lying on IC4 and IC5 will give higher satisfaction to the consumer than C, but they are unattainable with the given money income and given prices of the goods.
- It is concluded that with the given money expenditure and the given prices of the goods as shown PL the consumer will obtain maximum possible satisfaction and will therefore is in equilibrium at point C at which price line PL is tangent to indifference curve IC3. In this equilibrium position at point C the consumer will buy OK amount of good X and OG amount of good Y.
- At this tangency point C slope of price line and slope of indifference curve are equal.

4. DERIVATION OF DEMAND CURVE BY USING INDIFFERENCE CURVE APPROACH

- Demand curve directly relates price with demand. A demand curve indicates how much quantity of good will be purchased or demanded at various prices, assuming other factor remains constant.
- The demand curve shows inverse relationship between price and demand. It can be derived from price consumption curve and indifference curve analysis.
- In Marshallian utility analysis, demand curve is derived on the assumptions that utility is quantify and marginal utility of money remain constant with the change in price of the good.
- In indifference curve analysis, demand curve is derived without making these assumptions.
- Let derive demand curve by using indifference curve. It has been shown in following figure.



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- If a consumer has got income of Rs 600 to spend on goods. In above figure money is measured on OY-axis, while the quantity of good X, whose demand curve is derived is measured on OX axis.
- An indifference map of a consumer is drawn along with the many price lines or budget lines PL1, PL2, PL3 and PL4 showing different prices of the goods X.
- Price line PL1 indicates that price of the good X is Rs. 30 per unit. As price decreases from Rs. 30 to Rs. 20, the price line shifts to PL2.
- With a further decline in price to Rs. 15 the price line takes the position PL3. When the price of good X decreases to Rs. 12, the price line takes the position PL4.
- The many price lines have been obtained by using data of the following table.

DEMAND SCHEDULE		
Price of good X in Rs.	Price Line	Quantity Demanded
30	PL1	OP
20	PL2	OQ
15	PL3	OR
12	PL4	OS

- Tangency points between the various price lines and indifference curves, when joined together by a line constitute the price consumption curve which shows the amounts of good X demanded at the corresponding prices.
- With the price line PL1 the consumer is in equilibrium at point Q1 on the price consumption curve at which price line PL1 is tangent to indifference curve IC1. At this point Q1, consumer is purchasing OP units of good X.
- When price decreases price line shifts to PL2, the consumer is in equilibrium at point Q2. The consumer is purchasing OQ amount of good X.
- Similarly, with the price lines PL3 and PL4, the consumer is in equilibrium at point Q3 and Q4 of price consumption curve and demanding OR and OS units of good X at price Rs. 15 and Rs. 12 respectively.
- The adjoining demand schedule which has been derived from the indifference curves can be easily converted into a demand curve with price shown on the OY axis and quantity demand on OX axis.
- To understand easily, demand curve has been drawn rightly below the indifference curves in figure.
- In figure, at the bottom, on the OX axis the quantity demanded has been shown as in indifference figure above, but on the OY axis in the figure at the bottom price per unit of the good X has been shown instead of total money.
- To obtain demand curve, many points a, b, c, and d representing the demand schedule. By joining the points a, b, c and d we get demand curve DD.

INVESTMENT FUNCTION

1. CAPITAL BUDGETING:

❖ **Meaning of capital budgeting:**

- Capital budgeting or capital expenditure, management stays concern with planning and control of capital expenditure.
- This is an essential factor in the business management. It refers to long term for proposed capital outlays and their financing. It contains both rising of long-term funds as well as their utilisation.
- It may be defined as “the firm’s formal process for the acquisition and investment of capital”.
- Capital investment must be the result of capital budgeting and it is a reconciliation between marginal revenue and marginal cost.

❖ **Definitions:**

- **According to Charles T. Horngren**, “Capital budgeting is a long-term planning for making and financing proposed capital outlays”.
- **Gilman L.J. has put thus**, “Capital budgeting refers to the total process of generating, evaluating, selecting and following up on capital expenditure alternatives”.
- **Hampton John. J.** has defined it as “firm’s formal process for the acquisition and investment of capital”.
- As per **R.M. Lynch**, “Capital budgeting consists in planning for development of available capital for the purpose of maximising the long-term profitability of the firm”.

The above-mentioned definitions give the clear meaning of capital budgeting as management have faith in to be useful projects for the acquisition of new capital assets together with the estimated cost of each project.

❖ **Need for capital budgeting:**

1. **For proper study of future profitability:** capital budgeting is indispensable for establishing and running industrial organisation. To spend large amount for a project the management must make proper study of its future profitability.
2. **To secure adequate return:** For this purpose, higher working expenditures are to be reduced and inactivity of the machinery should be avoided. The level and planning period of investment should be done carefully through capital budgeting.
3. **Long term nature of fund:** Different investment proposals have changing degrees of risks and uncertainties. When a huge investment is made, it cannot be transferred, and the investment sinks. All these uncertainties can be avoided if a realistic capital budgeting is made.
4. **Managerial decision making:** the decision regarding choice of capital projects, addition to the stock of capital, replacement of worn-out capital, volume and timing of investment are very important for capital budgeting. Thus, capital budgeting is one of the areas of managerial decision making.

❖ **Process of capital budgeting:**

Process of capital budgeting may contain number of steps depending upon the size of the concern, nature of projects, their numbers, and diversities etc.

Phases of capital budgeting process:

1. **Project groups:** Capital expenditure proposals may be of two types:

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- (a) Proposals for revenues, and
- (b) Proposals for reducing the cost.

Under the first category, proposals to add new products and to increase the capacity in current lines may be comprised. Under the second category, additional proposals are comprised. Such proposals are designed to bring savings in cost.

2. **Project Evaluation:** It contains -Estimating the cost and benefits in terms of cash flows and selecting an appropriate criterion for judging the desirability of the projects.
3. **Project Selection:** This phase is related to the run and selecting the projects.
4. **Project Execution:** When capital expenditure proposals are finally selected, funds are allocated for them. It is the duty of the top management to ensure that funds are spent in accordance with the allocation made in the capital budgets.
5. **Follow up:** Lastly, a system of following-up the result of completed projects should be established.

❖ Determination of the optimum level of capital

- A profit maximizing firm will determine its optimum output at the level, where the marginal revenue equals the marginal cost of production. Similarly, the firm will determine its optimum stock of capital by producing at the level, where the marginal revenue productivity of capital equals the marginal cost of capital.
- Thus, $MRP_c = MC_c$. Where MRP_c = marginal revenue productivity of capital and MC_c = marginal cost of capital.
- Now, to discuss the decision to invest by the firm. First discuss the case, where the decisions are taken under the conditions of certainty or in other words when there exists perfect knowledge.
- The investor holds complete knowledge regarding the circumstances prevailing in the market, about the availability of the different investment opportunities and the costs and the returns on the various alternative projects.
- Three criteria are used to evaluate the profitability of projects under the conditions of certainty:
 1. Payback period method
 2. Net discounted present value method
 3. Internal rate of return method

1. Payback period method: The payback period of a project is the number of years that it takes for the total net cash flows from the project to become equal to the total investment outlay involved in the project. In other words, it is the time taken by a project to recover the total investment outlay from its total net cash outflows.

Payback period = total investment outlay ÷ total net cash outflows per period

2. Net discounted present value method: To obtain the net present value of a project, a firm must calculate the present value of the expected future net cash flows from the investment project under consideration and then to compare the value so obtained with the cost of the project. In deciding among two or more projects, the decision rule for a firm using the net discounted present value criterion is to opt for that project whose net present value is positive and reject a project with a negative net present value. The NPV can be calculated as follows:

$$NPV = -C + \frac{R_1}{1+i} + \frac{R_2}{(1+i)^2} + \frac{R_3}{(1+i)^3} + \dots + \frac{R_N}{(1+i)^N}$$

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where NPV is net present value, C is cost of the investment project, i is market rate of interest, and $R_1, R_2, R_3, \dots, R_N$ is positive net cash flows from the project in 1, 2, 3 to N years.

The decision rules are as follows:

The firm can accept the project if $NPV > 0$.

The firm can reject the project if $NPV < 0$.

The firm can accept or reject the project if $NPV = 0$.

3. Internal rate of return method: The internal rate of return is the rate of discount, which equates the net present value of the future net cash flows to the investment cost of the project. In other words, it is the internal rate of return. Thus,

$$C + \frac{R_1}{1+r} + \frac{R_2}{(1+r)^2} + \frac{R_3}{(1+r)^3} + \dots + \frac{R_N}{(1+r)^N}$$

❖ Sources of Capital

1. Internal Sources: These include depreciation reserves and retained earnings.
2. Firms often rely on their internal sources of funds for reinvestments because there are large costs involved in raising the funds from the market.
3. Also, there are uncertainties involved when funds are raised from external sources.
4. Use of internal funds for investments increases the market value of the stock of the firm.
5. External Sources: These are the funds raised by a firm from the market. They include issue of preferred and equity shares, sale of bonds and borrowing from the financial institutions.

2. INVESTMENT FUNCTION:

❖ Introduction:

- National income and employment depend upon the level of aggregate demand.
- The aggregate demand consists of consumption demand and investment demand.
- In the earlier section we have seen consumption function, which is useful in short run, investment function is important for determination of income and employment.
- Prof Keynes also emphasized for investment function.

❖ Meaning of investment:

- If a person purchase shares, bonds or debentures of a public limited company from the market, it is considered as he has made investment. But this is not real investment which determines income and employment in the country.
- Real investment is the addition to the stock of physical capital.
- Therefore, in economics, investment refers the new expenditure made on addition of capital goods such as machines, buildings, equipment, etc.
- The addition to the stock of physical capital i.e., net investment increases the level of aggregate demand which brings about addition to the level of income and employment in the economy.

❖ Types of Investment:

1. Business fixed investment
2. Residential investment
3. Inventory investment

According to Keynes,

CONSUMPTION AND INVESTMENT FUNCTION

I. Autonomous investment

II. Induced investment

1. Business fixed investment

- Business fixed investment refers investment in machines, tools, equipment that businessman purchase for further production of goods and services.
- The stock of these machines or plant equipment etc. shows fixed capital.
- The term fixed implies that expenditure made on the machines, equipment etc. continues to be used for production for a relatively long time.

2. Residential investment

- Residential investment means to the expenditure which people make on constructing or buying new houses.
- Residential investment depends on price of existing housing units. The higher the price of existing units, the higher will be investment in constructing and purchasing new housing units.

3. Inventory investment

- Firms possess inventories of raw material, semi-finished goods to be processed into final goods. The firms also hold inventories of finished goods to be sold shortly.
- The change in the inventories or stocks of these goods with the firms is called inventory investment.
- There are three objectives for holding inventories.
 1. For smoothing of the level of production.
 2. It is less costly for a firm to purchase inputs such as raw materials less frequently in large quantities to produce goods.
 3. To avoid 'running out of stock' possibilities when their sales of goods are high and therefore it is profitable to sell at that time.

❖ According to Keynes,

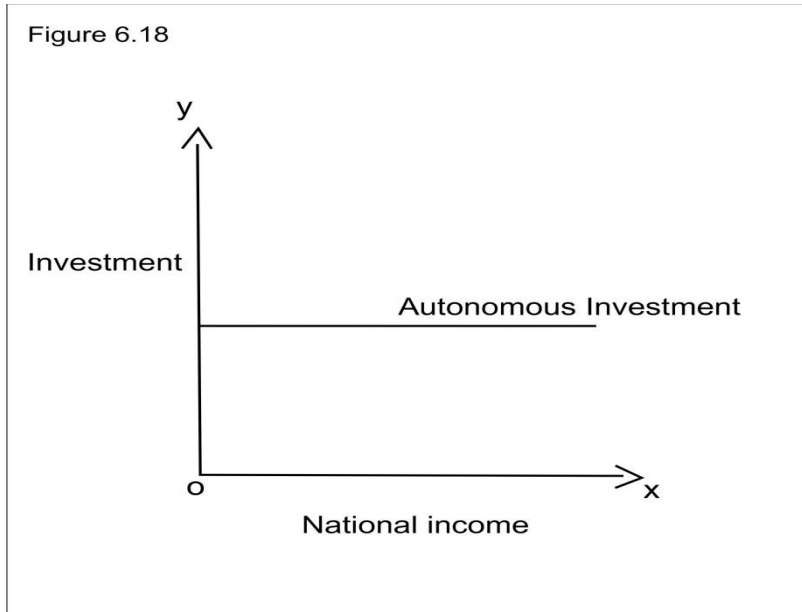
I. Autonomous investment:

- Autonomous investment is considered as that investment which does not change with change in the income level and therefore independent of income.
- According to Keynes, the level of investment depends upon marginal efficiency of capital and rate of interest. Change in income does not affect on investment.
- The above view of Keynes based upon his concern with short-run problem. He thought that change in income level will affect investment only in long run.
- The distinction between autonomous investment and induced investment has been made by post-Keynesian economists.
- Autonomous investment generally takes place in houses, roads, public undertakings and in other types of economic infrastructure such as power, transport and communication.
- This autonomous investment based upon more on population growth and technical progress

CONSUMPTION AND INVESTMENT FUNCTION

that on the level of income.

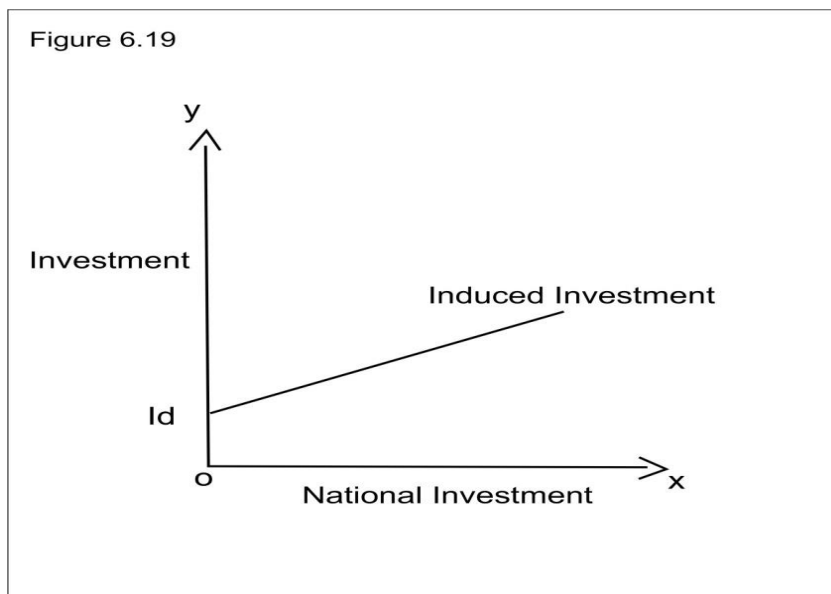
- This type of investment generally done by government. The investment undertaken by government in various development projects to accelerate economic growth of the country.
- Autonomous investment is depicted in following figure.



- It can be seen in the figure that whatever the level of national income, investment remains constant at AI. Thus, it has a horizontal straight line.

II. Induced investment:

- Induced investment is that investment which is affected by the changes in the level of income.
- The greater the level of income, the larger will be the consumption of the community.
- According to Keynes, rate of interest determines induced investment. But according to empirical evidence, induced investment depends more on income than on the rate of interest.
- The following figure shows about induced investment.



CONSUMPTION AND INVESTMENT FUNCTION

- It is seen in the figure with the increase in national income induced investment is increasing.
- Increase in national income clears that demand for goods increases.
- To produce greater output, more capital goods are required to produce them.
- To have more capital goods more investment is done.
- The induced investment is undertaken both in fixed capital assets and in inventories.

❖ **Determinants of investment:**

Investment demand depends upon two factors:

1. Marginal Efficiency of Capital.
2. The Rate of Interest.

1. Marginal Efficiency of Capital

- Marginal efficiency of capital means to the rate of profit expected to be made from investment in certain capital assets.
- The rate of profit expected from an additional unit of a capital asset is called as marginal efficiency of capital.
- For example, if a businessman spends \$10,000 on the purchase of a new grinding machine. We assume further that this new capital asset continues to produce goods over a long period of time. The net return (excluding meeting all expenses except the interest cost) of the grinding machine expected to be \$1000 per annum. The marginal efficiency of capital will be 10%. $(1000/10000) \times (100/1) = 10\%$

❖ **DEFINITION OF MEC:**

- According to Kurihara, “MEC is the ratio between the prospective yield of additional capital goods and their supply price”.
- In the words of W.C. Peterson, “The rate of return over cost relates the expected yield of a capital good to its supply price. It is the relationship that Keynes calls MEC.

❖ **ESTIMATION OF MEC:**

- First, to estimate marginal efficiency of capital, the entrepreneur will first take into consideration. How much price he has to pay for the particular asset.
- The price which he has to pay for the particular capital asset is called supply price or cost of capital.
- Second, prospective yields: it means he will consider is that how much yield he expects to receive from investment from that assets.
- Thus, 1. Supply price and 2. Prospective yield of a capital asset determine the marginal

CONSUMPTION AND INVESTMENT FUNCTION

efficiency of capital.

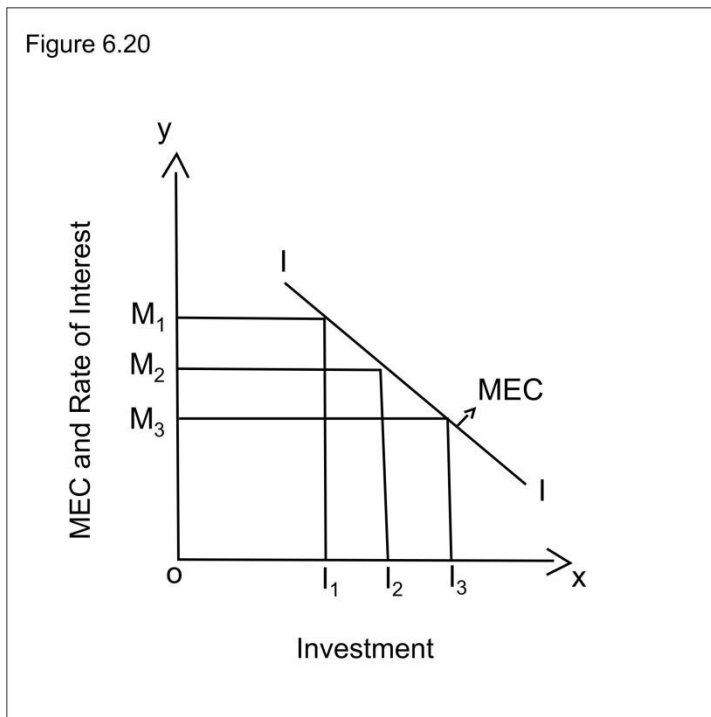
- Keynes has explained MEC as a discount rate which makes the prospective yield of a capital asset equal to its supply price.

Supply price = Discounted prospective yield

$$SP = (R_1 / 1+r) + (R_2 / (1+r)^2 + \dots + R_N / (1+r)^N$$

Where SP = Supply Price, R_1, R_2, \dots, R_N etc. represent the annual prospective yield from the capital asset, r is that rate of discount which renders the annual prospective yields equal to the supply price of the capital asset.

- According to J.M. Keynes, the behaviour of investment in respect of new investment depends upon the various stock of capital available in the economy at a particular period. As the stock of capital increases in the economy, the marginal efficiency of capital goes on diminishing. The MEC curve is negatively sloped as shown in the following figure.



In above figure, investment in capital assets is measured on OX-axis and MEC on OY axis. It is seen from the figure that when investment in capital assets is equal to OI_1 , MEC is m_1 , when investment is OI_2 , MEC declines to m_2 , similarly, when investment increases to OI_3 , MEC further diminishes to m_3 .

❖ Factors Affecting MEC:

The marginal efficiency of capital affects by short run as well as long run factors. These factors are as follows:

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Short Run Factors:

- (i) **Demand for the product.** If the market for a particular good is likely to raise and its costs are likely to fall, the rate of return from investment will be more. If entrepreneurs expect a decline in demand of goods and a rise in cost, then rate of return from investment will decline.
- (ii) **Liquid assets.** If the entrepreneurs are holding large volume of working capital, they can take advantage of the investment opportunities that come in their way. The MEC will be high and viceversa.
- (iii) **Sudden changes in income.** The MEC also affects by sudden changes in income of the entrepreneurs. If the business community gets windfall profits, or there is tax concession etc., the MEC will be high and hence investment in the country will go up. On the other hand, MEC falls with the decrease in income.
- (iv) **Current rate of investment.** Another factor which affects MEC is the current date of investment in a particular industry. If in a particular industry, much investment has already taken place and the rate of investment currently going on in that industry is also very large, then the marginal efficiency of capital will be low.
- (v) **Wave of optimism and pessimism.** The marginal efficiency of capital also affects by waves of optimism and pessimism in the business circle. If businessmen are optimistic about future, the MEC will be overestimated. During periods of pessimism the MEC is underestimated.

❖ **Long Run Factors:**

The long run factors which affect the marginal efficiency capital are as follows:

- (i) **Rate of growth of population.** Marginal efficiency of capital is also influenced by the rate of growth of population. If population is growing rapidly, it is generally believed that at the demand of various classes of goods will increase. So, a rapid rise in the growth of population will increase the marginal efficiency of capital and a slowing down in its rate of growth will discourage investment and thus reduce marginal efficiency of capital.
- (ii) **Technological development.** If investment and technological development take place in the industry, the prospects of increase in the net yield brightens up. For example, the development of automobiles in the 20th century has greatly stimulated the rubber industry, the steel and oil industry, etc. So, we can say that inventions and technological improvements encourage investment in various projects and increase marginal efficiency of capital.
- (iii) **The quantity of capital goods of relevant types already in existence.** If the quantity of any particular of goods is available in abundance in the market and the consumers can partially or fully meet the demand, then it will not be advantageous to invest money in

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that project. So, in such cases, the marginal efficiency of capital will be low.

- (iv) **Rate of taxes.** Marginal efficiency of capital is directly influenced by the rate of taxes levied by the government on various commodities, when taxes are levied, the cost of commodities is increased, and the revenue is lowered. When profits are reduced, marginal efficiency of capital will naturally be affected. It will be low.

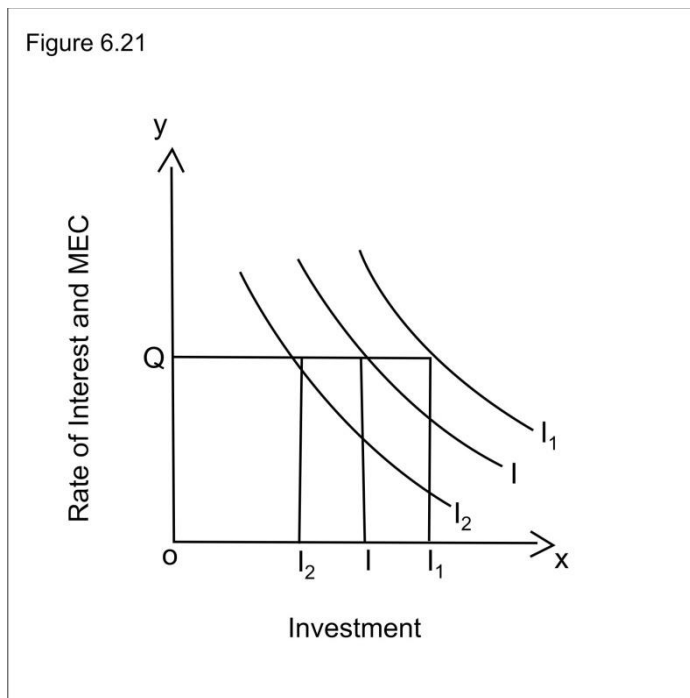
2. Rate of interest and investment demand curve:

- The inducement to invest based upon MEC and rate of interest. With the given rate of interest and given the MEC, the equilibrium level of investment can be shown.
- The equilibrium level of investment is achieved at that point where MEC is equal to given current rate of interest.
- It can be seen in the figure 6.20. Thus, if rate of interest is m_1 , then I_1 investment will be taken.
- Since at OI_1 level of investment MEC is equal to rate of interest m_1 .
- If the rate of interest decreases to m_2 , investment in capital asset will increase to OI_2 since at OI_2 level of investment the new rate of interest m_2 is equal to MEC.
- Hence, the curve of MEC shows the demand for investment or inducement to demand curve.
- This investment demand curve represents how much investment will be taken by the entrepreneur at various rates of interest.
- If the investment demand curve is less elastic, then investment demand will not increase much with the decline in rate of interest.
- If investment demand curve is much elastic, then the change in rate of interest will bring about changes in investment demand.

❖ Business expectations:

- Marginal efficiency of capital depends upon supply price of capital and prospective yield.
- Prospective yield is affected by the expectations of the entrepreneur regarding profit making and these expectations changes frequently.
- It is the business expectations of the entrepreneur which determine level of investment.
- If the expectations of the entrepreneur regarding profit making become blurred, the marginal efficiency of capital declines and as a result demand for investment decreases. The existence of depression is mainly because of the pessimistic expectations of the entrepreneurial class regarding profit making.
- If the expectations of the entrepreneur regarding profit opportunities increases, then inducement to invest rises. Consequently, increase in investment, aggregate demand in the economy increases and level of employment and income increases.
- If the expectations change then the whole curve of MEC will shift. It has been shown in following figure.

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- If profit expectations decrease, then the MEC curve, that is investment demand curve will shift downward to left, as shown by shift of the curve from I to I_2 in above figure. On the other hand, when the profit expectations of the entrepreneurial class become better than before, the MEC curve will shift upward to the right, as shown by the MEC curve I_1 .
- Downward shift in MEC refers that a given rate of interest, less investment will be taken. And upward shift in the MEC refers that more will be invested at a given rate.
- It follows from above that rate of interest along with MEC determine the volume of investment.
- If the rate of interest is higher than the marginal efficiency of investment, it will not be profitable to invest in a new physical asset. This is because that the aim of individual investor is to maximize his money profits.
- If the marginal efficiency of investment is lower than the current rate of interest, it is more profitable to lend one's money rather than use it for investing in new capital assets.
- When marginal efficiency of investment equals the current rate of interest, we have the equilibrium level of the rate of investment.
- It follows that rate of investment also depends on the rate of interest. The rate of interest is generally 'sticky' in the short run, while marginal efficiency of investment can fluctuate from one extreme to another. If there is a divergence between the two, generally, the marginal efficiency of investment will adjust to the rate of interest.
- If, for example, the marginal efficiency of investment is higher than the current rate of interest, with the increase in investment, marginal efficiency of investment will decrease. At the point where it is just decreased to the level of current rate of interest, further investment will cease.

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THEORY OF MULTIPLIER

❖ Introduction:

- The concept of multiplier first introduced by **F. A. KAHN** in the early 1930s. He has developed the concept of multiplier with reference to increase in employment, directly or indirectly, because of initial increase in investment and employment. Therefore, **Kahn's** multiplier was known as employment multiplier.
- But **Keynes** further redefined it. He has propounded the concept of multiplier with increase in investment and income. Therefore, **Keynes's** multiplier is known as investment or income multiplier.

❖ Meaning and Illustration:

- The multiplier is the ratio of increment in income to the increment in investment. Suppose ΔI stands for increment in investment and ΔY stands for the increase in income, then multiplier is equal to the ratio of increment in income (ΔY) to the increment in investment (ΔI).

Thus, $k = \frac{\Delta Y}{\Delta I}$ where k stands for multiplier.

- For example, if Rs. 200 crores investment is made, then the income will not increase by Rs. 200 crores only but a multiple of it. Suppose because of the investment of Rs. 200 crores, the national income increases by Rs. 600 crores, multiplier is equal to 3.
- Why increase in income is many times more than increase in investment. It is because, for this, Government will pay wages to the labourers engaged, prices for the materials to the suppliers and remunerations to other factors who make contribution to the work of road, building. The total cost will amount to Rs. 200 crores. This will increase incomes of the people equal to Rs. 200 crores. But this is not all.
- The people who obtain Rs. 200 crores will devote a good part of them on consumer goods. Suppose marginal propensity to consume of the people is 70%. Then out of Rs. 200 crores they will spend Rs. 140 crores on consumer goods, which would increase incomes of those people who supply consumer goods equal to Rs. 140 crores. But those who receive these Rs. 140 crores will also in turn spend these incomes, depending upon their marginal propensity to consume.
- The chain of consumption expenditure would continue, and the income of the people will go on increasing.

❖ Derivation of Investment Multiplier:

- Investment multiplier in mathematical form has been expressed as follows.

If ΔY = Increase in Income, ΔI = Increase in Investment, MPC = Marginal Propensity to Consume.

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$$\Delta Y = \Delta I \cdot \frac{1}{1 - MPC}$$

$$\frac{\Delta Y}{\Delta I} = 1/(1 - MPC)$$

$\frac{\Delta Y}{\Delta I}$ measures the size of multiplier

Therefore, Size of multiplier or $k = \frac{1}{1 - MPC}$

- The size of multiplier depends on the marginal propensity to consume of the community. The multiplier is the reciprocal of 1-MPC.
- As saving is equal to income minus consumption, one minus marginal propensity to consume will be equal to marginal propensity to save, that is, 1- MPC = MPS.
- Therefore, multiplier is equal to $\frac{1}{1 - MPC} = \frac{1}{MPS}$

❖ Algebraic Derivation of Multiplier

- The equation for the equilibrium level of income is.

$$Y = C + I \dots \text{(i)}$$

- Multiplier analysis means change in income induced by change in investment, rewriting the equation (i) in terms of changes in variables.

$$\Delta Y = \Delta C + \Delta I \dots \text{(ii)}$$

- In the simple Keynesian model of income determination, change in investment is known to be autonomous or independent of changes in income while change in consumption is function of change in income.

In the consumption function,

$$C = a + bY$$

a = constant term, b = marginal propensity to consume. a and b is assumed constant.

- Therefore, change in consumption can happen only if there is change in income.

$$\text{Thus, } \Delta C = b \Delta Y \dots \text{(iii)}$$

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Substituting (iii) into (ii) we have

$$\Delta Y = b\Delta Y + \Delta I$$

$$\Delta Y (1 - b) = \Delta I$$

$$\Delta Y = \frac{\Delta I}{1-b}$$

$$\frac{\Delta Y}{\Delta I} = 1/(1 - b)$$

$b = \text{marginal propensity to consume}$

$$\frac{\Delta Y}{\Delta I} = \frac{1}{1-MPC}$$

$$\frac{\Delta Y}{\Delta I} = \frac{1}{MPS}$$

- Thus, above equation shows formula of multiplier. It should be noted that $\frac{\Delta Y}{\Delta I}$ will remain fixed if MPC remains the same.

Calculating the size or value of multiplier

- The size or value of multiplier is the reciprocal of marginal propensity to save.
- Thus, the value of multiplier can be obtained by marginal propensity to consume and marginal propensity to save.
- Given the size of multiplier from the net increase in investment, the total increment in income that will occur as a result of investment can be found out.
- $MPC = 4/5$, size of multiplier, $\frac{1}{1-MPC}$, $k = \frac{1}{1-4/5}$, $k=5$.

❖ Two limiting cases of the value of multiplier

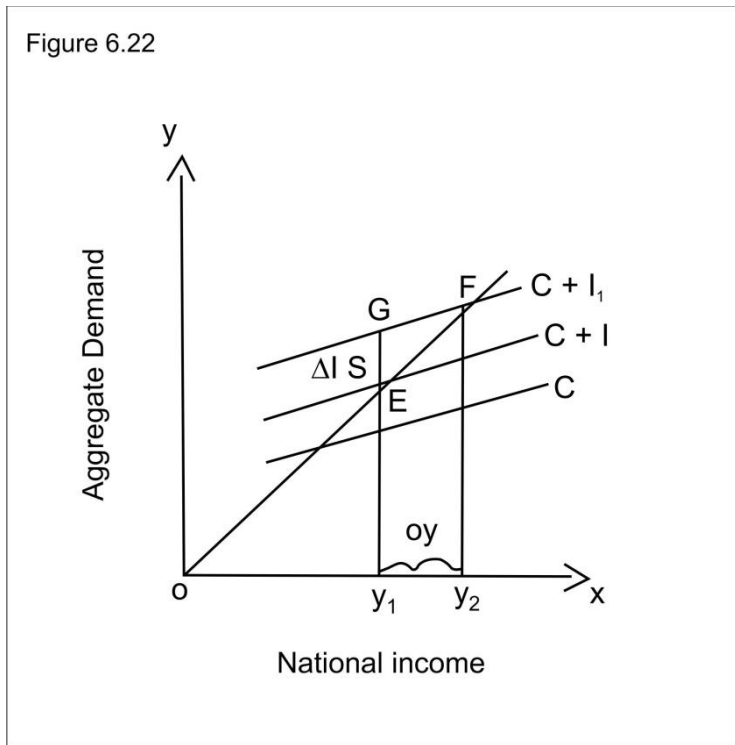
- (i) $MPC = 1$. First limiting case occurs when the MPC is equal to one, that is, when all income is consumed, and nothing is saved. In this case, the size of multiplier will be equal to infinity.
- (ii) $MPC = 0$ Second limiting case occurs when marginal propensity to consume is equal to zero, it means nothing to be consumed from all income, and all income is saved. In this case, the value of multiplier will be equal to one. That is, in this case the increment in income will be equal to the original increase in investment and not a multiple of it.

But in real practice the MPC is less than one but more than zero ($1 > \frac{\Delta C}{\Delta Y} > 0$) Thus, the value of multiplier is greater than one but less than infinity.

❖ Diagrammatic representation of multiplier

- The level of national income is determined by the equilibrium between aggregate demand and aggregate supply. The level of national income is fixed at the level where $C + I$ curve intersect the income curve. The multiplier is illustrated in following figure.

CONSUMPTION AND INVESTMENT FUNCTION



- In above figure C indicates MPC. It is assumed to $MPC = 0.5$. Therefore, the slope of the curve C ($MPC = 0.5$). C + I represent aggregate demand curve. It can be seen in the figure that the aggregate demand curve C + I which intersects the line at point E so that level of income equal to OY_1 is determined.
- If investment increase by the amount EG, we can find how much increment in income will occur. Consequently, increase in investment by EG, the aggregate demand curve shifts upward to the new position C+I₁. This new aggregate demand curve C + I₁ intersects the income line at point F so that the equilibrium level of income increases to OY_2 .
- Therefore, because of net increase in investment equal to GH, the income has increased by Y_1Y_2 . It can be seen from the figure that Y_1Y_2 is greater than GH.

❖ NUMERICAL EXAMPLE OF MULTIPLIER

- Suppose in a country investment increases by Rs. 200 and consumption is given by $C = 20 + 0.12 Y$. where C = consumption, Y = income. How much increase will there take place in income?

Solution:

$$\text{Multiplier, } k = k = \frac{\Delta Y}{\Delta I} \text{ OR } \Delta Y = k \cdot \Delta I$$

$$\text{Now, } \frac{1}{1 - MPC}$$

$$MPC = 0.12$$

$$k = \frac{1}{1 - 0.12} = \frac{1}{0.88} = 1.14$$

$$\Delta I = \text{Rs. } 200$$

$$\text{Thus, } \Delta Y = 1.14 \times 200 = 228$$

❖ THEORY OF ACCELERATOR

Introduction:

- T.N. Carver was the earliest economist who recognised the relationship between changes in consumption and net investment in 1903. But it was Aftalion who analysed this principle in detail in 1909.
- The term “acceleration principle” itself was first introduced into economics by J.M. Clark in 1917.
- It was further developed by Hicks, Samuelson, and Harrod in relation to the business cycles.

❖ THE PRINCIPLE OF ACCELERATION

- The principle of acceleration is since the demand for capital goods is derived from the demand for consumer goods which the former help to produce.
- The acceleration principle explains the process by which an increase (or decrease) in the demand for consumption goods leads to an increase (or decrease) in investment on capital goods.
- According to Kurilara, “The accelerator coefficient is the ratio between induced investment and an initial change in consumption expenditure”.

The accelerator theory of investment is determined from a set of propositions:

- Investment is determined from the difference between the desired level of capital and the capital that survives from the past.
- The capital that undergoes from the past is a constant proportion of past capital.
- The wanted level of capital is proportional to the predictable level of output.
- The level of capital, actual or expected, is proportional to the level of output, actual or expected.
- If the economy is operating at full utilization of capital, then investment is proportion to the expected change in output for the period ahead.
- The expected change in output in the future will be the same as the latest known change in output.
- Symbolically, $v = \Delta I / \Delta C$ or $\Delta I = v \Delta C$
- If the increase in consumption expenditure of Rs 10 crores leads to an increase in investment of Rs 30 crores, the accelerator coefficient is 3.
- Where, • v is the accelerator coefficient,
 - ΔI is net change in investment and
 - ΔC is the net change in consumption expenditure.
- We shall discuss some of the post-Keynesian theories of investment and refinements in the accelerator theory. First, we explain the simple accelerator principle in its crudest form which is known as the naive accelerator.

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- The accelerator principle states that an increase in the rate of output of a firm will require a proportionate increase in its capital stock.
- The capital stock refers to the desired or optimum capital stock. K^* . Assuming that capital-output ratio is some fixed constant, v , the optimum capital stock is a constant proportion of output so that in any period t .
- $K = vY$, where K^* is the optimum capital stock in period t ,
- v (the accelerator) is a positive constant, and
 Y_t is output in period t .

Any change in output will lead to a change in the capital stock.

Thus, $K^*_t - K^*_{t-1} = v(Y_t - Y_{t-1})$ and

$Int = v(Y_t - Y_{t-1})$ [$Int = K^*_t - K^*_{t-1}$] $= v \Delta Y_t$

Where $\Delta Y_t = (Y_t - Y_{t-1})$, and Int_t , is net investment. This equation represents the naive accelerator.

- In the above equation, the level of net investment is proportional to change in output. If the level of output remains constant ($\Delta Y = 0$), net investment would be zero. For net investment to be a positive constant, output must increase.

❖ CHECK YOUR PROGRESS

1. Explain the law of diminishing marginal utility.
2. Discuss about law of Equimarginal utility.
3. Critically evaluate Marshall's cardinal utility analysis.
4. Discuss the following concepts.
 - A. Indifference curve
 - B. Budget line
 - C. Marginal rate of substitution
5. Explain consumer equilibrium with the help of figure.
6. Derive demand curve with the help of indifference curve.
7. Give meaning of capital budgeting. Discuss its needs and process.
8. What is investment function? Discuss its types with the help of figure.
9. Write a note on the following.
 1. Theory of Multiplier
 2. Accelerator Theory
 3. Business Expectations

1. Multiple Choice Questions:

1. Who has given the cardinal approach to consumer equilibrium analysis?
 - a. Prof. Marshall
 - b. Prof. Samuelson
 - c. Prof Hicks
 - d. None of above.

Ans. a. Prof. Marshall

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2. Which of the following is not assumption of Marshall's Cardinal Utility Analysis?
- The cardinal measurement of utility
 - The supposition of independent utilities
 - Ordinal measurement
 - Introspective Method

Ans. c. Ordinal measurement

3. _____ means want-satisfy power of a commodity.
- Satisfaction
 - Utility
 - Indifference Curve
 - Production

Ans. b. Utility

4. _____ means additional utility received from the consumption of one more unit of given commodity.
- Total Utility
 - Marginal Utility
 - Indifference Curve
 - Average Utility

Ans. b. Marginal Utility

5. _____ states that the consumer will distribute his money income in such a way that the utility derived from the last rupee spent on each good is equal.
- Law of Diminishing Marginal Utility
 - Law of Equimarginal Utility
 - MRS
 - None of above.

Ans b. Law of Equimarginal Utility

6. Indifference curves represent all those combinations of goods which give _____ satisfaction to the consumer.
- Equal
 - More
 - Less
 - None of Above

Ans a. Equal

7. Indifference curves are _____ to origin.
- Concave
 - Convex
 - Straight line
 - Vertical line

Ans b. Convex

CONSUMPTION AND INVESTMENT FUNCTION

8. Which one is not property of Indifference Curve?
- Indifference curves are downward slopping.
 - Indifference curves are convex to the origin.
 - Indifference curves can intersect each other.
 - Higher indifference curve represents a higher level of satisfaction than a lower indifference curve.

Ans c. Indifference curves can intersect each other.

9. _____ is defined as a set of combinations of two commodities that can be purchased if whole of a given income is spent on them and its slope is equal to the negative of the price ratio.
- Indifference Curve
 - Marginal Utility
 - Budget Line
 - Total Utility.

Ans c. Budget Line

10. When indifference curve and price line intersect each other, this is known as _____.
- Consumer Equilibrium.
 - Price line
 - Marginal utility
 - Indifference Curve

Ans a. Consumer Equilibrium.

11. _____ refers to investment in machines, tools, equipment that businessman purchase for further production of goods and services.
- Autonomous investment
 - Induced investment
 - Business fixed investment
 - Variable Investment

Ans c. Business fixed investment

12. _____ means the expenditure people make on constructing or buying new houses.
- Business Fixed Investment
 - Autonomous Investment
 - Residential investment
 - Induced Investment

Ans c. Residential investment

13. Induced investment is that investment which is affected by the changes in the level of income.
- True
 - False
 - Uncertain
 - None of above

Ans a. True

CONSUMPTION AND INVESTMENT FUNCTION

14. _____ and Prospective yield of a capital asset determine the marginal efficiency of capital.
- Supply Price
 - Demand Price
 - Investment Function
 - Accelerator

Ans a. Supply Price

15. The concept of multiplier first introduced by F. A. KAHN in the early 1930s is known as _____.
- Investment Multiplier
 - Employment Multiplier
 - Both (a) and (b)
 - None of the above.

Ans b. Employment Multiplier

16. _____ is the ratio of increment in income to the increment in investment.
- Multiplier
 - Accelerator
 - MEC
 - MPC.

Ans a. Multiplier

17. According to Kurilara, “The _____ is the ratio between induced investment and an initial change in consumption expenditure”.
- Accelerator Coefficient
 - Multiplier
 - MEC
 - MPC.

Ans a. Accelerator Coefficient

2. Numerical Problems

- Suppose the level of autonomous investment in an economy is Rs. 200 Crores and consumption function of the economy is $C = 80 + 0.75 Y$.
 - What will be the equilibrium level of income?
 - What will be the increase in national income if investment increases by Rs. 25crores?

ANS : a. = 1120 crores., b. = 100 crores

- Suppose in a country investment increases by Rs. 100 and consumption is given by $C = 10 + 0.6Y$. where C = Consumption, Y = income. How much increase will take place in income?

ANS. = 250

MCQ Answer

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
a	c	b	b	b	a	b	c	c	a	c	c	a	a	b	a	a

7.0 INTRODUCTION**7.1 PRODUCTION FUNCTION WITH ONE VARIABLE INPUT****7.2 PRODUCTION FUNCTION WITH TWO VARIABLE INPUTS
(FACTORS):****7.3 PRODUCTION FUNCTION WITH ALL VARIABLE INPUTS
(LONG RUN PRODUCTION FUNCTION)****7.4 COST ANALYSIS****❖ CHECK YOUR PROGRESS**

7.0 INTRODUCTION

1. Meaning of Production:

- Generally, production means creating something but man cannot create the matter. He can change its utility or add utility to it.
- If consumption means extracting utility from the matter, production means putting utility into the matter.
- Production, therefore, is defined as creation of utility. But to produce a thing which has utility but not value will not be regarded as production.
- In economics production, therefore, should be defined not as creation of utility but creation or addition of value.
- Utility can be created or added by changing the form of matter. For example, a carpenter makes furniture out of pieces of wood.
- Utilities can be created by the change of place by transportation by land, sea or air. For example, traders and businessmen are engaged in the movement of commodities from places where they are comparatively plentiful and have therefore, relatively lower value places where they are less abundant and have therefore, greater value.
- Production may also include the creation of time utilities. Storing and preserving things and carrying them over from period of plenty to periods of scarcity is known as creation of time utilities.
- Persons executing direct personal services to consumers are supposed to create service utility. Like doctors, lawyers, teachers, musicians do not create any material yet their services do give satisfaction to consumers and possess exchange value.

2. Meaning of Factors of Production:

- The term “factors of production” and “resources” are used interchangeably with the term “inputs”.
- Production of goods and service requires the use of factors of production which are also called agents of production.

- Fisher defines “factors of production as a group or class of productive resources”.

3. Classification of Factors of Production:

- Factors of production are classified into four categories.
 1. Land,
 2. Labour,
 3. Capital and
 4. Entrepreneur.

1. Land:

❖ Meaning and Significance:

- In economics does not consider as mere soil, it is considered as all-natural resources available from air, water, from above the land surface and below it which can be used for production.
- In the words of Marshall, land means “the material and the forces which nature gives freely for man’s aid, in land and water, air, light and heat”.
- In every stage of economic evolution nature has been man’s most useful ally. In the hunting and the fishing stage, nature supplied food freely and sustained human life.
- The utility of land is obvious in the agricultural stage for how else could man grow high crops without soil, air sunshine? When the agricultural stage has given place to the industrial stage, land still remains essential.
- As Marshall said, “earth’s surface is a primary condition of anything that a man can do, it gives him room for his action”.

❖ From the above definition, following characteristics of land can be stated.

1. Land can be used as renewable and renewable resources.
2. An important characteristic of land is that it is fixed in supply.
3. An important aspect of land from the viewpoint of economic development is that it is the main agent of production of wage goods.

2. Labour:

- Labour does not consider as merely physical or mental exertion, but it is considered as all types of work done by man/woman for monetary reward.
- The contribution of labour to the national product and income depends not only the size of labour force but also on its quality. Quality of labour shows how much productive it is, that is, what is its level of productivity.
- Division of labour is an important factor determining efficiency of labour force.
- Division of labour is an important feature of modern industrial organizations. Division of labour may be simple or complex.
- Simple division of labour refers to the production of a single commodity by a person.
- But in the modern days, division of labour is of complex type, complex division of labour refers that the making an article is split up into several processes and each process is carried out by a separate worker on a separate group of workers.

3. Capital:

❖ Physical Capital

- The term capital is used in economics in many senses. In ordinary language and sometimes in economics also capital is used in the sense of money.
- The money which is available for investment and productive purposes is called money capital or financial capital by some economists. But money capital is not real capital.
- The real capital is meant the whole of the stock of wealth includes machines, tools, implements raw materials etc. which is used for the production of further goods.
- Capital is defined as „produced means of production“. This definition differentiate capital from both land and labour because both are not produced factors. Land and labour are often considered as primary or original factors of production. But capital is not a primary or original factor, it is a produced factor of production. Capital is produced by man by working with nature. Hence, capital is defined as man-made instrument of production.
- Capital, thus consists of those physical goods which are produced for use in future production.
- Capital is classified into fixed capital and working capital. Fixed capital are durable use producers“ goods which are used in production again and again till they wear out. Machinery, tools, railways, tractors, factories are example of fixed capital. Capital like plant, tractors, and factories are called fixed capital because if money is spent on these durable goods, it becomes fixed or unrealised for long period.
- Working capital are the single use producers“ goods like raw material, fertilizers, goods in process and fuel. They are used up in a single act of production. Moreover, money spent on them is fully recovered when goods made with them are sold in the market.

❖ Human Capital

- In a modern era, a new concept of human capital has been grown and emphasized.
- Human capital means the stock of people equipped with education, skills, health etc.
- It is observed that the rate of economic growth achieved in the developed countries cannot be wholly explained by the increase in physical capital and advances in technology. A major part of economic growth has occurred due to accumulation of humancapital.
- An educated, trained and skilled man is much more productive than an uneducated, untrained and unskilled.
- In the view of Prof. M. M. Mehta, one of the major tasks confronting the developing countries is the building of human capital. There is a growing realisation that a rapid rate of human capital formation is as important a precondition of economic growth as the rapid rate of physical capital formation.”
-

4. Entrepreneur:

- Entrepreneur brings above three factors together assigning work to each and bears the risk and uncertainty of production.
- Entrepreneur has also been called the organiser, the manager and risk taker. But now a days, the task of manager and organiser has become different from that of entrepreneur.
- While the organisation and management contain decision making of routine type, the real task of the entrepreneur may employ on wage basis managers who manage day-to-day bear affair of the organisation. Further, whereas the hired managers get fixed wages, the entrepreneurs bear risk and uncertainty of the production work.

From above definition of entrepreneur following functions of entrepreneur can be described.

- Taking Initiative
- Organizing Resources
- Identifying Opportunities and Prospects
- Risk-Taking
- Decision Making
- Technology Transfer and Adaptation
- Innovation
- Fostering Autonomy
- Social Responsibility
- Public Relations
- Experience Sharing
- Managerial Roles
- Balanced Economic Development

1) **Meaning and Significance of Production Function in Business Meaning of Production Function**

- The performance of production contains the transformation of inputs into output. Production is a transformation of physical inputs into physical output.
- The term production function refers to the relationship between the inputs and outputs produced by them. All those goods and services that a firm uses in the process of production is termed as „inputs. For example, a firm may be using labour, capital and land.
- The production function shows the relationship between input and output under condition of given technology. Therefore, given the technical conditions of production, the output (production) of a particular commodity depends on the quantity of inputs (factors).
- The production function can be expressed as follows.
$$Q = f(L, C).$$

In above equation Q stands for quantity or production or output, L stands for labour, C stands for capital, f shows functional relationship. Thus, it can be said that Q is a function of labour and capital. It implies that production (output) depends on inputs (labour and capital).

From above definition of production function, following characteristics of production function can be stated.

1. The production function represents a technical relationship between physical input and output. It does not take into consideration money cost or price of the output sold.
2. The technical knowledge is constant. It can be possible that same number of inputs may produce higher level of output if a better technology is applied in production.
3. The production function shows the maximum quantity of output that can be produced from given quantities of inputs.
4. Production function is referred with particular period of time.
5. Production function is represented in various forms such as by tables, by equations, by total, average and marginal product curves and by iso-quants.

❖ **Significance of Production Function in Business**

Production function is useful in many ways. The significance of production function can be explained with the help of following example.

- Product functions are used in managerial economics to determine the most efficient combination of inputted resources needed to produce a desired number of products. They're not exact replications of real circumstances and aren't intended to be. Instead, they're abstract models intended to focus on the problem of the efficient usage of resources available to the business. It helps the management-
 - To find the most profitable rate of operation of the firm.
 - To determine the optimum quantity of output to be produced and supplied.
 - To determine in advance the cost of business operations.
 - To locate weak points in production management to minimize costs.
 - To fix the price of the product.
 - To decide what sales channel to use.
 - To have a clear understanding of alternative plans and the right costs involved in them.
 - To have clarity about the various cost concepts.
 - To decide and determine the very existence of a firm in the production field.
 - To regulate the number of firms engaged in production.
 - To decide about the method of cost estimation or calculations.
 - To find out decision making costs by reclassifications of elements, reprising of input factors etc., so as to fit the relevant costs into management planning, choice etc.

❖ **Linear Homogeneous Production Function**

- The linear homogeneous production function shows that if the inputs increased in some proportion, then output also increases in the same proportion.
- So that, a production function is called to be linearly homogeneous when the output changes in same proportion as that of change in the proportion of input factors. Such as output gets doubled with the doubling of input factors and gets tripled on the tripling of the production.
- This is also a case of constant returns to scale. Here the elasticity of

substitution is one.

- This production function is used for empirical studies, such as linear programming, and input-output analysis.
- This production function is also known as homogeneous of the first degree and mathematically it is represented as $P_n = f(L_n, C_n)$ where „n“ stands for n times, thus, P_n = change in production n times, L_n = change in labour n times, C_n = change in capital in n times.
- The above equation shows that with an increase in units of labour and capital by n times, the output also increases in the same proportion i.e., n times.

❖ **Types of Production Function:**

- In economic theory, we concerned with three types of production function.
 1. Production function with one variable input
 2. Production function with two variable inputs and
 3. Production function with all variable input

7.1 PRODUCTION FUNCTION WITH ONE VARIABLE INPUT
(short run production function)

- In economic theory, the production function with one variable input is illustrated with the well-known law of variable function. It is also known as *short run production function*, because in the short run some factors of production such as capital and land remain fixed, while other factors such as labour, raw material remains variable.
- The law of variable proportion is the fundamental laws of economics. It is also called **law of diminishing marginal returns**.

❖ **LAW OF VARIABLE PROPORTION (one factor fixed and others variable):**

- Law of variable proportion shows the input output relationship or production function with one factor variable while other factors of production are kept constant. In other words, law of variable proportion expresses the relationship between units of a variable product and the total physical product.
- **According to P.A. Samuelson**, “an increase in some inputs relative to some other fixed inputs will, in a given state of technology, cause output to increase, but after a point, the extra output resulting from some additions of extra inputs will become less and less.”
- **Marshall** he has stated the law in relation to agriculture. According to him, “an increase in the labour and capital applied in the cultivation of land causes in general a less than proportionate increase in the amount of product raised unless it happens to coincide with an improvement in the arts of agriculture.”

❖ **ASSUMPTIONS:**

- **Constant technology:** it is assumed that technology remains constant. If

technology changes, marginal and average product may increase instead of diminishing.

- Short run: this law operates in the short run because it is here that some factors are fixed and other are variable. But in the long run all factors are variable.
- Homogeneous factor: the variable input as applied unit is homogeneous or identical in amount and quality.
- Fixed factor: it is possible to use various amounts of a variable factor on the fixed factors of production.

❖ **ILLUSTRATION:**

The law of variable proportion has been illustrated in the following table. Considering the table 7.1 it is explained. And it is assumed that there is a given fixed amount of land, with more variable input, labour is used to produce amount of output.

Table 7.1			
Fixed Factor (land)	Variable Factor (labour)	Total Physical Product (TPP)	Marginal Physical Product (MPP)
1	1	1	-
1	2	2	1
1	3	6	4
1	4	12	6
1	5	16	4
1	6	18	2
1	7	18	0
1	8	14	-4
1	9	8	-6

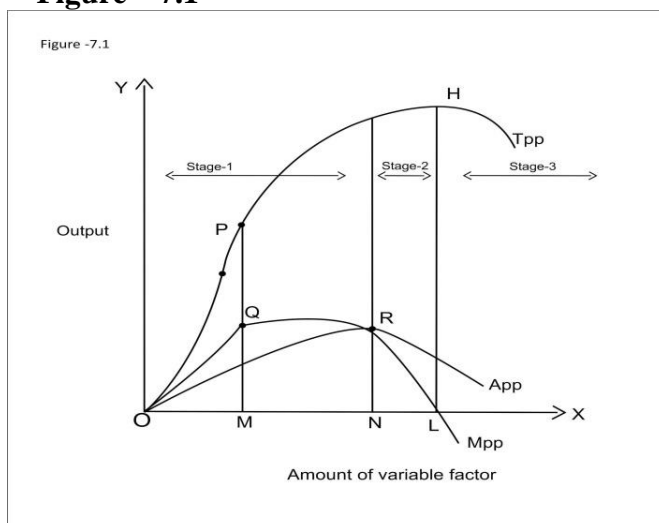
- In the above example, land is the fixed factor, and labour is the variable factor. With a given from fixed quantity of land as a farmer increases employment of labour from one unit to six unit, the total physical product increases from 1 unit to 18 units.
- Beyond the employment of 7 units of labour, total physical product diminishes. It should be noted that up to the use of 4 units of labour, total physical product increases at an increasing rate. This fact is clearly revealed from the column of marginal physical product which implies increment in total physical product in total production due to use of an extra unit of labour.
- Thus, when 4 units of labour are employed, marginal physical product of labour is 6 and with the use of 5th and 6th units of labour marginal physical product of labour decreases to 4 and 2 respectively.
- Beyond the use of 7th unit of labour, total physical product decreases and marginal physical product of labour becomes negative.

❖ **THREE STAGES OF LAW OF VARIABLE PROPORTION:**

The total, marginal and average physical product curves in following figure

demonstrate the law of variable proportion. This figure also shows three stages of production.

Figure – 7.1



STAGE-1

- In this stage total physical product to a point increases at an increasing rate. In above figure, from the origin of P point, slope of total physical product is increasing, i.e., up to point P, the total physical product (TPP) increases at an increasing rate which implies that marginal physical product (MPP) of labour will be increasing.
- From the point P onwards during the stage -1 the TPP curve goes on increasing but its slope is decreasing beyond P which means that from point P onwards the total product increases at a decreasing rate, i.e., marginal physical product decreases but is positive.
- The point P where the total physical product stops increasing at an increasing rate and begins increasing at the diminishing rate is called point of inflection. Corresponding vertically to this point of inflection P marginal physical product of the variable factor i.e., labour is maximum at point Q or the amount of variable factor used equal to OM after which it slopes downward.
- Thus, marginal physical product of the variable factor starts decreasing beyond the inflection point P on the total physical product curve TPP or from point Q on MPP curve of variable, that is beyond OM amount of the variable factor used.
- This stage ends where the average product curve reaches its highest point R or ON amount of the variable factor is used.
- It should be noted that the marginal physical product in this stage increases initially and in a later part it begins decreasing but remains greater than the average product the average product continues to increase in stage-1.

STAGE-2

- In this stage, the total physical product continues to increase at a decreasing rate until it reaches its maximum point K where the second stage ends.

- In this stage both the marginal product and average product of the variable factor are decreasing but remain positive.
- At the end of the second stage, that is, point L, marginal physical product of the variable factor is zero, corresponding to the highest point H of the TPP curve.

STAGE-3

- In stage-3 total physical product decreases and therefore the curve TPP slopes downward.
- As a result, marginal physical product of the variable factor is negative and marginal physical product of the variable factor goes below the OX axis. And this stage is known as negative returns.
- The following table represents behaviour of MPP, APP and TPP.

Table 7.2		
Total Physical Product (TPP)	Marginal Physical Product (MPP)	Average Physical Product (APP)
STAGE-1		
Increases at increasing rate	Increases, reaches its maximum & then decreases till MP=AP	Increases and reaches its maximum
STAGE-2		
Increases at a diminishing rate till it reaches maximum	It diminishing and becomes equal to zero	Start decreasing
STAGE-3		
Start decreasing	Becomes negative	Continues to decline

7.2 PRODUCTION FUNCTION WITH TWO VARIABLE INPUTS (FACTORS):

- To know a production function with two variable inputs, it is necessary to know about

Isoquants. Isoquant is also known as *Isoproduct* curve or production indifference curves.

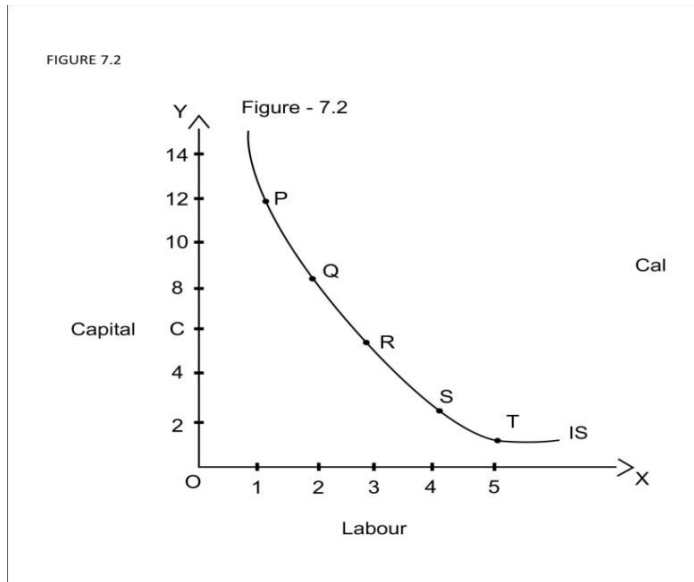
- We will explain the concept of Isoquant and their properties.

❖ **Concept of Isoquants:**

- An Isoquant indicates all those input combinations which are capable of producing the same level of output.
- Thus, isoquant curve shows the various combinations of two variable inputs resulting in the same level of output.
- The following table and figure represent how different pairs of labour and capital result in the same level of output.

Table 7.3			
Factor Combination	Units of Labour	Units of Capital	Units of Output
P	1	12	50
Q	2	8	50
R	3	5	50
S	4	3	50
T	5	2	50

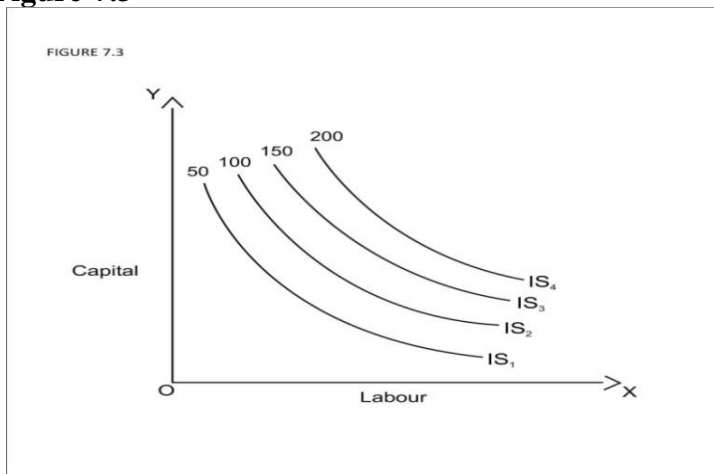
Figure-7.2



- In the above figure 7.2, units of labour have taken on OX axis and units of capital has taken on OY axis.
- P, Q, R, S, and T show different combination of labour and capital yielding same level of output as 50 units, by joining these points, we obtain isoquant IS curve which is also known as equal product curve.

❖ **ISOQUANT MAP**

Figure-7.3



- The above figure 7.3 shows isoquant map or equal product map with a set of four isoquants shows 50 units, 100 units, 150 units and 200 units respectively.
- From the set of isoquants, it can be seen isoquant moves upward to the

right, higher isoquant represents higher level of output. The whole array of isoquants is represented on a graph, which is called isoquant map.

❖ **Marginal Rate of Technical Substitution (MRTS).**

- MRTS indicates that level, where one factor (input) is replaced with another factor and production remain constant.
- Suppose there are two variable inputs i.e., labour and capital, thus, marginal rate of technical substitution of labour for capital is defined as the number of units of capital which is replaced by one unit of labour, the level of output remaining unchanged. If the quantity of labour is reduced, the quantity of capital must be increased to produce the same output.
- The MRTS can easily be understood by table 7.3 where each input combinations P, Q, R, S and T give same level of output.
- The MRTS at a point on an isoquant can be known from the slope of the isoquant at that point. Thus, the slope of isoquant has a technical name i.e., MRTS. MRTS of labour for capital as follows.

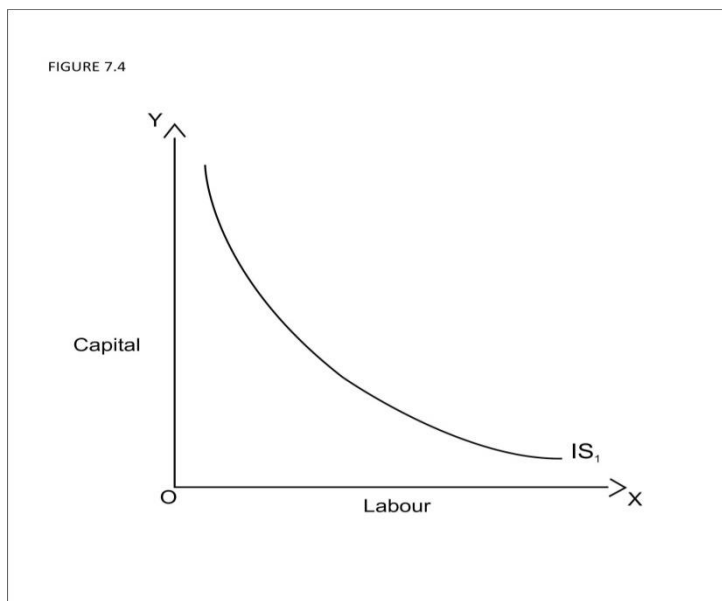
$$MRTS_{lc} = \frac{\Delta C}{\Delta L}$$

❖ **Properties of Isoquant:**

The main properties of isoquant are as follows.

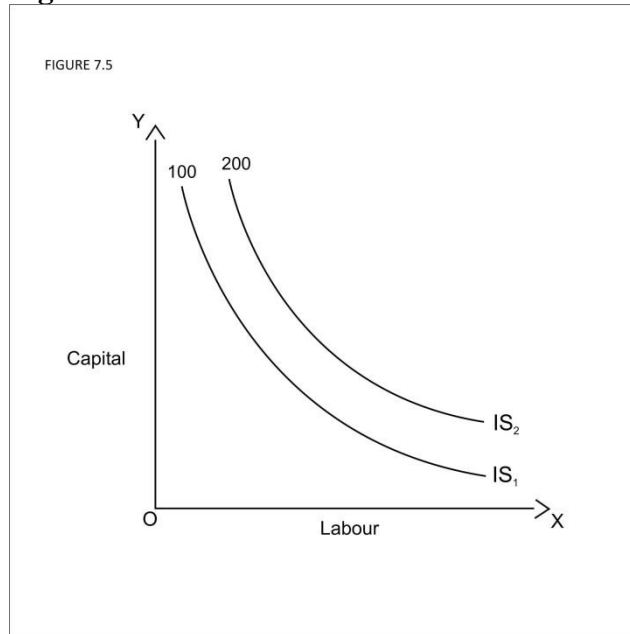
1. **Downward sloping from left to right:** An isoquant is downward sloping from left to right i.e., negatively tending. This implies that for the same level of output, the quantity of one variable will have to be decreased to increase the quantity of the other variable. This has been shown in the following figure 7.4.

Figure-7.4



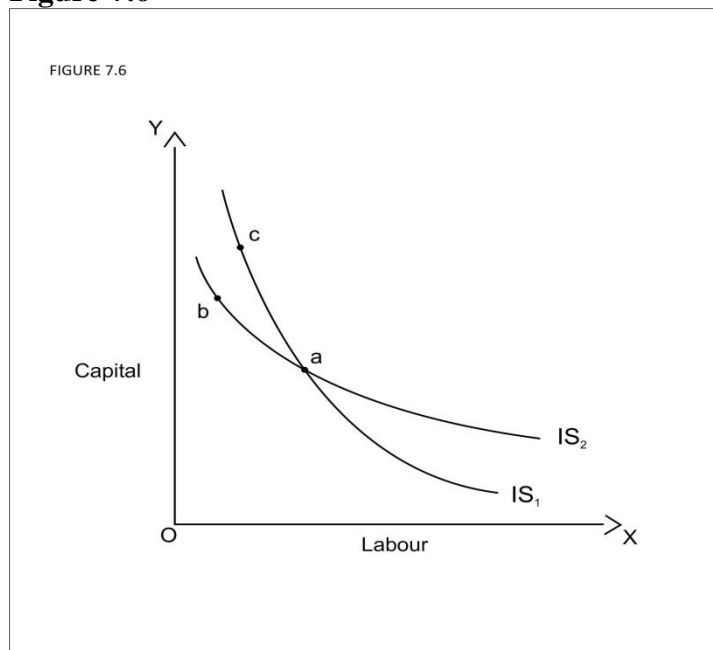
2. **Higher isoquant represents higher level of output:** it implies with the same quantity of one input and larger quantity of the other input, larger output is produced. This is shown in following figure.

Figure-7.5



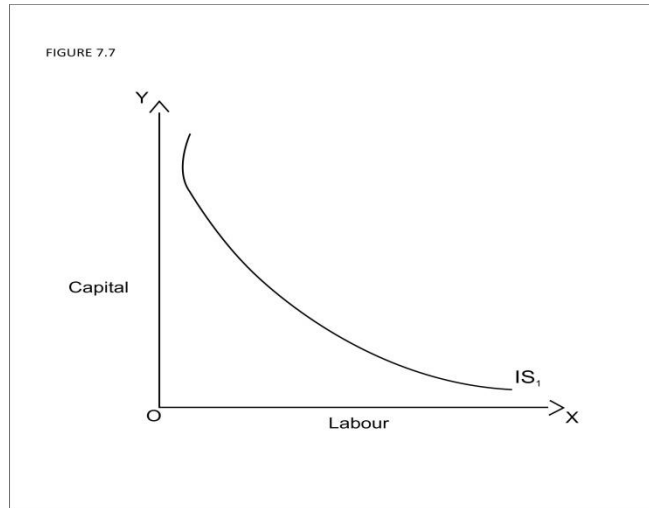
3. **No two isoquant intersect each other:** If two isoquants intersect or touch each other, it would mean that there will be a common point on the two curves and it would show same amount of two inputs can produce two different levels of output which is irrational as shown in figure 7.6.

Figure-7.6



4. **Convex to origin:** isoquant is convex to the origin. This implies that its slope decreases from left to right along the curve. In other words when we increase the quantity of one input, the number of other input decreases, thus it can be said that fewer units of capital are sacrificed for additional units of labour. This is shown in the following figure 7.7.

Figure-7.7



**7.3 PRODUCTION FUNCTION WITH ALL VARIABLE INPUTS
(Long run production function)**

- In the long run, all factors of production are variable. When all factors are increased without changing factor proportions is called increasing returns. The study of change in output as a result of changes in the scale forms the subject-matter of „returns to scale“.

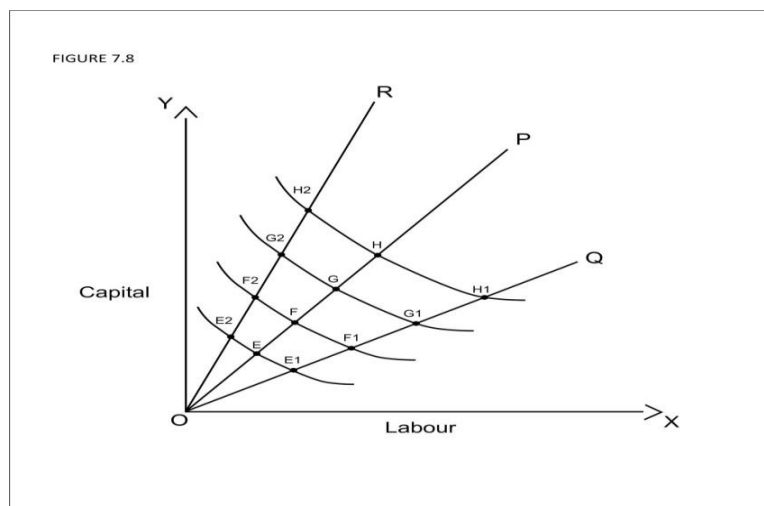
❖ **Returns to Scale:**

- Returns to scale may be constant, increasing or decreasing. Here we assume that there are two factors of production, labour and capital. This makes easy to understand the concept of returns to scale.

❖ **Constant Returns to Scale:**

- Constant return to scale is referred as the increase in the scale or the amounts of all factors leads to a proportionate increase in output, that is doubling of all inputs doubles the output.
- Constant return to scale is also called linearly homogeneous production function or homogeneous production of the first degree.
- The following figure 7.8 shows constant return to scale

Figure-7.8

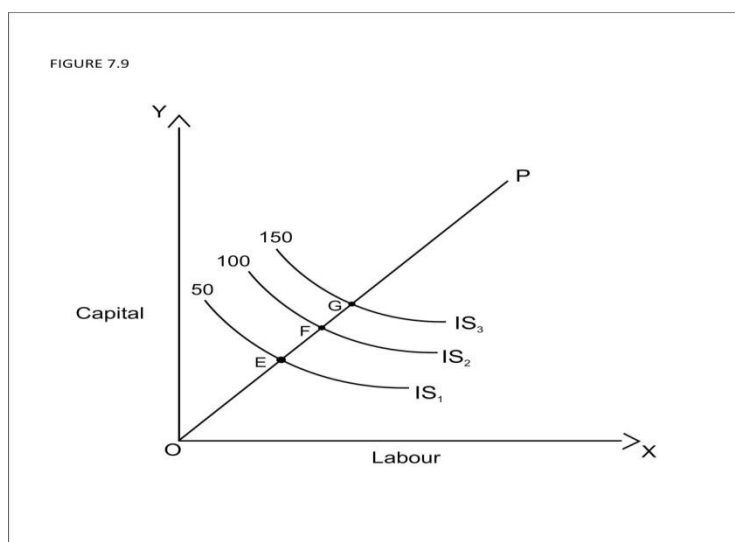


- The above figure 7.8 shows an isoquant map. To know whether return to scale is constant or not, we draw straight lines by the origin.
- It can be seen from the figure that successive isoquants are equidistant from each other along each straight line drawn from the origin.
- Thus, along the line OP, $EF=FG=GH$, and along between the successive isoquants being the same along the line OQ, $E1F1=F1G1=G1H1$ and along the OR, $E2F2= F2G2 = G2H2$.
- The distance shows factors are increase in some proportion and output increases in the same proportion.
- For example, in one year a firm employs 400 workers, uses 100 machines and produce 2000 products. In a second year 800 workers by using 200 machines (inputs doubled) and produce 4000 products (output doubled). This is a case of constant return to scale.

❖ **Increasing Return to Scale**

- If output increases more than proportionately, it is the case of increasing return to scale.
- In other words, increasing return to scale is closely associated with economies of scale. It occurs when a firm increases its inputs and more than proportionate increase in production.
- For example, one year, a firm employs 200 workers, uses 50 machines, and produces 1000 products. In a second year, it employs 400 workers, uses 100 machines (inputs doubled), and produces 2,500 products (output more than doubled).
- The following figure shows increasing returns to scale.

Figure-7.9



- It can be seen in above figure when increasing return to scale occur, the successive isoquant will lie at decreasingly smaller distance along a straight-line OP through the origin.
- In figure various isoquants IS1, IS2, and IS3 are drawn which shows 50,

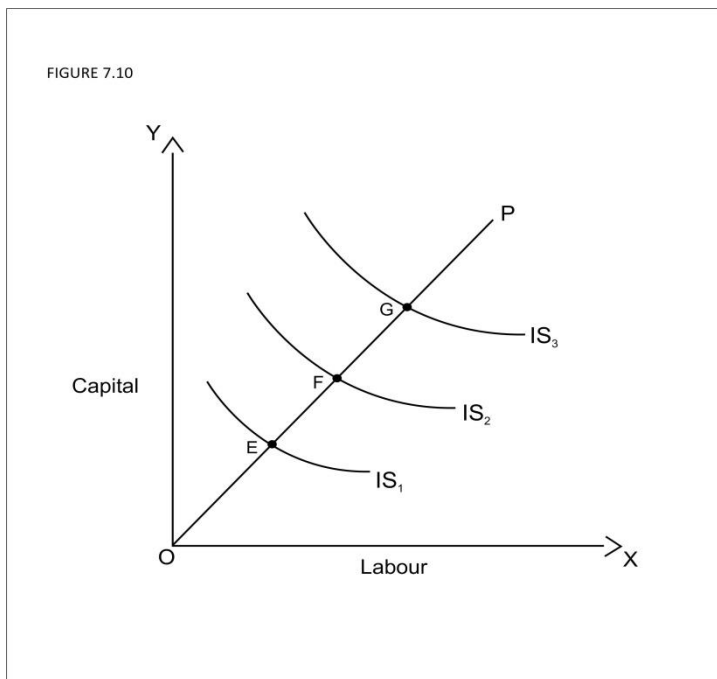
100 and 150 units.

- It is observed from figure that distances between the successive isoquants decreases as expand output by increasing return to scale.
- Thus, increasing return to scale occur when $OE > OF > OG$, which implies that equal increase in output is received by smaller and smaller increments in inputs.

❖ **Decreasing Return to Scale**

- If output increases less than proportionately, we have a case of decreasing return to scale.
- It is closely associated with diseconomies of scale.
- For example, one year, a firm employs 200 workers, uses 50 machines, and produces 1000 products. In a second year, it employs 400 workers, uses 100 machines (inputs doubled), and produces 1,500 products (output less than doubled).
- Decreasing return to scale is shown in following figure.

Figure-7.10



- It can be seen from figure that successive isoquants IS1, IS2 and IS3 lie at progressively larger and larger distance on a ray through the origin, returns to scale will be diminishing.
- Thus, decreasing return to scale occur when $OE < OF < OG$, which implies that equal increase in output is received by more and more increments in inputs.

❖ **Cobb-Douglas Production Function:**

Introduction:

- Many economists used actual production function and used statistical

methods to know the relations between changes in physical inputs and outputs.

- The Cobb-Douglas production function is founded by the empirical study of the American manufacturing industry by Paul H. Douglas and C.W. Cobb.
- It is a linear homogeneous production function of degree one which considers two inputs, labour and capital, for the entire output of the manufacturing industry.

❖ **Mathematical Equation:**

- Mathematically Cobb- Douglas production function can be expressed as follows

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

Where Q= manufacturing output

L= quantity of labour employed

C = capital

A, α , and β = parameters of function

- In a study, Cobb-Douglas production function found that about 75 percent of the increasing in manufacturing output was because of the labour input and the rest 25 percent was because of the capital input.
- This function can be estimated by the use of regression analysis. It is also used for elasticity of labour and capital.
- Output elasticity of a factor indicates the percentage change in output as a result of given percentage change in the quantity of input.

❖ **Properties:**

1. The sum of the exponents in Cobb-Douglas production function i.e., $\alpha + \beta$ calculatoreturns to scale.
 - If $\alpha + \beta = 1$, it shows constant returns to scale.
 - If $\alpha + \beta > 1$, it shows increasing returns to scale.
 - If $\alpha + \beta < 1$, it shows decreasing returns to scale.
2. The other important property of Cobb-Douglas production function is that when exponents are equal to one i.e., $\alpha + \beta = 1$, so it is called linear homogeneous production function. The average and marginal products of factors depend upon the ratio in which factors are combined for the production of a commodity. Linear Cobb-Douglas production function can be written as follows

$$Q = AL^\alpha C^{1-\alpha}$$

❖ **Average Product of factors and Cobb-Douglas Production Function**

- It can be obtained from dividing the production function by the amount of input (labour).
- Thus, *Average Product of Labour* = $\frac{AL^\alpha C^{1-\alpha}}{L} = \frac{AC^{1-\alpha}}{L^{1-\alpha}} = A(C/L)^{1-\alpha}$
- Where A and α are constants, average product of labour will depend on the ratio of factors (C/L) and will not depend on absolute quantities of factors used.

❖ **Marginal Product of Factors and Cobb-Douglas Production Function**

- Like the average product of a factor, the marginal product of a factor of a linear Cobb- Douglas production function also based upon the ratio of the inputs and is independent of the absolute quantities of the inputs used.
- Marginal product of a factor is the first derivative of production function with respect to labour. It is obtained as follows.

- $O = AL^\alpha C^{1-\alpha}$

$$\text{Marginal Product of Labour} = \frac{dO}{dL} = A\alpha L^{\alpha-1} C^{1-\alpha}$$

$$= \frac{A\alpha L^\alpha C^{1-\alpha}}{L}$$

$$= \frac{A\alpha L^{\alpha-\alpha} C^{1-\alpha}}{L^{1-\alpha}} = \frac{A\alpha C^{1-\alpha}}{L^{1-\alpha}} = A\alpha(C/L)^{1-\alpha}$$

- Where A and α are constants, marginal product of labour will depend on capital output ratio (C/L), i.e., capital per labour and is independent of the absolute quantities of factors employed.

Criticisms:

1. The production function normally discussed in economics is a thoroughly developed micro economic concept. Though, Cobb-Douglas, by assessing production function for national economies for manufacturing sectors, and even for industries, moved firmly micro-economic concept to a macro-economic without adequately justifying their act on logical economic grounds. Thus, the result of their studies, in the form of equations they resulting may be improper and hence the explanations based on their equations are doubtful.
2. The production function of economic theory undertakes that the quantities of inputs employed are those that are actually used in production, so that no variable input is ever jobless. In Cobb- Douglas studies, only labour was measured by the quantity actually used in production, whereas capital was measured by capital investment, i.e., the quantity available for production. Thus, with the possible exception of the years in which full employment and prosperity prevailed and industry made reasonably full use of the available inputs, the measure of capital was not the theoretically right one. Only if annual capital input always continued a constant proportion of total capital investment, would the elasticities be the same.
- 3.

In spite of these criticisms, the Cobb-Douglas production function is useful for interpreting economic results.

7.4 COST ANALYSIS

1. Various Concept of Costs

❖ Money Cost:

- The term cost has a many variety of meaning. There are many types of costs and it is important to make differentiation between them.
 - There is one cost i.e., money cost which is important in cost of production.
 - Money cost refers to the aggregate money spending incurred by a firm to produce a commodity.
 - It is total of various sums of money paid to the factors of production for the services extracted by them in production process.
 - For example, the cost of producing 200 tables is Rs 15000, then it will be called the money cost of producing 200 tables.
 - Thus, money cost includes following expenditure.
 - Depreciation charge
 - Power fuel charge
 - Wages
 - Cost of machinery and raw material
 - Expenditure on advertisement and publicity
 - Capital interest
 - Insurance charges
 - Transportation cost
 - Packing charge
 - All types of taxes property tax, license fees, excise duty
 - Rent on land
 - According to Prof. Hanson, “The money cost of producing a certain output of a commodity is the sum of all the payments to the factors of production engaged in the production of that commodity.”
 - Furthermore, total money cost of firm includes explicit cost and implicit cost
1. **Explicit cost:** Explicit costs contain a transfer of money and can be recorded on a balance sheet. For example, purchase of raw materials, purchase of new assets, hiring of workers etc. All these have monetary cost and the transactions will be recorded. So, explicit cost is measurable and will be included in profit/loss accounts. For example, if the firm hires a new employee, their salary will be an explicit cost which will be put on the accounting balance sheet. The explicit cost of hiring an employee may be Rs 2,00,000 a year.
 2. **Implicit cost:** Implicit costs are the supposed or estimated loss in revenue from undertaking an action, but they do not have an actual transfer of money and are not recorded in accounting balance sheets. An example of an implicit cost is having to deal with a fire alarm, which causes a factory to shut down for two hours. There is no observable increase in costs,

however by stopping production, it leads to lower output and so there is a loss of sales and income – even if it will not be recorded. For example, A decision not to sell an asset will lead to a depreciation in value and a loss of potential revenue from selling it, Spending bank reserves on investing in a project will lead to a loss of interest on the former bank savings, the cost of investing in a new factory is an explicit cost, but the loss of interest is an implicit cost, A business owner may take a pay cut to remain profitable. This loss of earnings for the owner is an implicit cost for business, A football team may decide to keep ticket prices below the market equilibrium out of a sense of loyalty to the local community, this will lead to implicit costs of lower revenue than otherwise could have been achieved, A firm may give a worker

„ „compassionate leave”” to take time off work. This leads to a loss of output which is not directly measured, Failure to sell Christmas trees by 25 December. If a firm has 10 Christmas Trees unsold on 25 December, it represents a loss of potential income – there may also be time cost of disposing of trees. On Christmas Eve, there may be good case to lower price to sell remaining trees. At this time, the price the firm paid in November is a sunk cost – it can't recover this accounting cost. Sometimes firms suffer from the fallacy of sunk costs – wanting to get back the actual explicit cost, but sticking rigidly to this can lead to the implicit costs of fewer sales.

- Accounting cost is referred as explicit cost while economic cost is referred as implicit cost
- Briefly, money cost = total explicit cost + total implicit cost

❖ **Real cost:**

- Real costs are the pains and inconveniences experienced by labour to produce a commodity. These costs are not taken in a costing of the commodity by the firm. Real cost has been defined differently by different economists.
- Classical economists have defined real cost as pains and sacrifice of labour.
- Marshall calls real cost as social cost and described as “real cost of efforts of various qualities and real cost of waiting.”
- The Austrian School of Economist have criticized the meaning given to real cost by the classical economist and neo classical economists. According to them, to give a subjective value to cost is a hopeless task as when real cost is expressed in terms of sacrifice or pains. It is not agreeable to detailed measurement and thus it fails to explain the phenomenon of prices.

❖ **Opportunity cost:**

- Modern economists have rejected the labour and sacrifices link to represent real cost. Rather, in its place they have substituted **opportunity** or **alternative cost**.
- The concept of opportunity cost occupies an important place in economic theory. The concept was first developed by an Austrian economist, Wieser.
- The other prominent contributors are Daven Port, Knight, Wicksteed and Robbins.

- The concept is grounded on the fundamental fact that factors of production are scarce and adaptable.
- Our needs are unlimited. The resources to satisfy these wants are limited, but they are accomplished of alternative uses. Therefore, the problem of choice arises. This is the core of Robbins' definition of economics.
- The opportunity cost of anything is the alternative that has been foregone. This implies that one commodity can be produced only at the cost of foregoing the production of another commodity.
- According to Prof. Byrns and Stone "opportunity cost is the value of the best alternative surrendered when a choice is made."
- According to John A. Perrow "opportunity cost is the amount of the next best produce that must be given up (using the same resources) in order to produce a commodity."
- As Adam Smith observed, if a hunter can bag a deer or a beaver in the course of a single day, the cost of a deer is a beaver and the cost of a beaver is a deer.
- A man who marries a girl is foregoing the opportunity of marrying another girl. A film actor can either act in films or do modelling work. She cannot do both the jobs at the same time. Her acting in film results in the loss of an opportunity of doing modelling work.

❖ **Importance of the concept of opportunity cost:**

1. To determine relative prices of goods: This concept is useful to determine the relative prices of different goods. For example, if a given number of factors can produce one freeze or three television, then the price of one freeze will tend to be three times equal to that one television.
2. To fix the price of factor: This concept is also useful for fixing the price of a factor. For example, suppose that the alternative employment of a banker is work as a professor in a college at a salary of Rs. 8000 per month in such a case, he has to paid at least Rs. 8000 to continue to hold him in bank.
3. Efficient allocation of resources: The concept is useful in allocating resources efficiently. For example, opportunity cost of one freeze is three television and the price of one television is Rs. 5,000, while the price of freeze is Rs 25,000. Under such circumstances, it is beneficial to produce one freeze rather the 3 television, he will get only Rs. 15,000, whereas a freeze fetches him Rs. 25,000, i.e., Rs. 10,000 more.

❖ **Limitations:**

1. This concept has following limitations.

1. Specific: If a factor's service is specific, it cannot be put to alternative uses. The transfer cost or alternative cost in such a case is zero. This is pure rent, according to Mrs. Joan Robinson.
2. Inertia: Sometimes, factors may be unwilling to move to alternative occupations. In such a case, a payment exceeding the pure transfer cost will have to be made to induce it to take to a substitute occupation.
3. Perfect Competition: The concept rests on the assumption of perfect competition. However, perfect competition is a myth, which rarely

prevails.

4. Private and Social Costs: A difference is likely to arise between private and social costs. For example, let us assume that a chemical factory discharges industrial refuse into a river. This causes serious health hazards, which cannot be measured in money terms.
5. Alternatives are not clearly known: The foregone opportunities are often not discoverable. This also poses a serious limitation of the concept.

2. Cost Function:

- The cost function shows functional relationship between output and cost. By including prices of inputs into the production function, one gets the cost function is derived from production function. Though, the nature of cost function depends upon the time horizon. In micro economic theory, we deal with short run and long run time.
- The cost function can be written as follows.

$$C = f(Q, P)$$

Where C = Total cost of production

Q = Quantity of input employed by the firm P = Price of relevant input

- This cost equation implies that cost of production depends upon price of input and quantity of input used by firm.

❖ Importance of Cost Function:

- Allocation of Resources: Cost function is a resultant function. It is derived from the production function which captures the technology of a firm. The theory of cost is a concern of managerial economics. Cost analysis supports allocation of resources among various alternatives. In fact, knowledge of cost theory is essential for making decisions relating to price and output.
- Decision- Making: Whether production of a new product is a cleverer one on the part of a firm greatly depends on the evaluation of costs related with it and the possibility of earning revenue from it. Decisions on capital investment are made by comparison the rate of return from such investment with the opportunity cost of the funds used. The relevance of cost analysis in decision-making is usually understood in terms of short and long periods of time by economists. In all market structures, short run costs are crucial in the determination of price and output. This is because of the fact that the basis for cost function is production and the prices of inputs that a firm pays.
- For planning: Long run cost analysis is used for planning the best scale of plant size. It means, long run cost functions offer useful information for planning the growth as well as the investment policies of a firm. Growth of a firm mainly depends on cost considerations.

❖ **What is short run and long run regarding cost concept?**

- There are some factors which are easily adjustable with changes in the output level. Firm can use readily to them, if it has to increase output.
- Therefore, labour, raw materials, chemicals, etc. are the factors which can be readily varied with the changes in output. These factors are called variable factors.
- There are factors such as capital equipment, building, top management personnel which cannot be so readily varied. These are called fixed factors.
- Regarding the differentiation between variable factors and fixed factors, economist distinct between the short run and long run.
- In the short run, output can be increased or decreased by changing only the amounts of variable factors such as labour, raw material etc., amount of fixed factor such as capital equipment, factory building etc., cannot be varied for making changes in output.
- In the long run, all factors are varied.

3 Types of Cost

❖ **Short run costs: Total Cost, Fixed Cost and Variable Cost:**

- In economics, total cost can be defined as total money expenditure on all inputs used for production.
- It includes expenditure on land, building, machinery, labour, interest on capital, insurance premium, transport, advertisement etc. these all are called explicit cost. The other cost i.e., implicit cost, is also included in total cost. Thus, total cost is the summation of explicit cost and implicit cost.
- Total cost is divided in two parts – 1. Fixed cost and 2. Variable cost
- Thus, Total cost = Total Fixed Cost + Total Variable Cost.

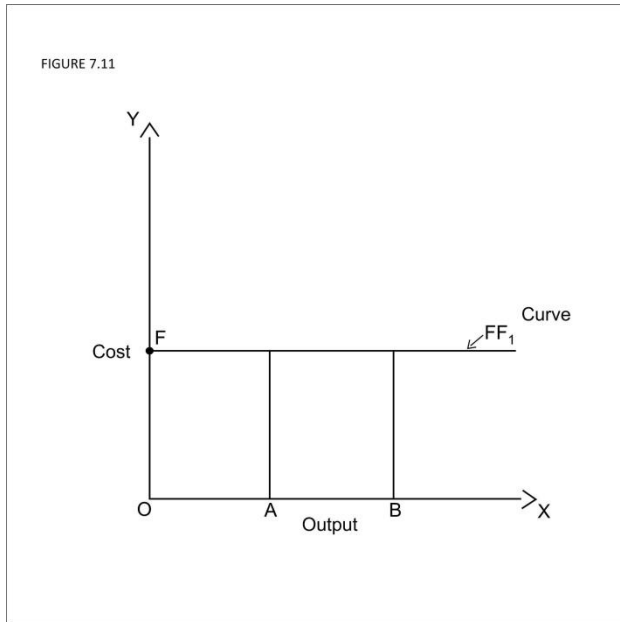
❖ **Fixed Cost:**

- Fixed costs are those costs which are independent of output, that is, they do not change with changes in output. They remain fixed when output increases or decreases or even becomes zero.
- These costs are a „fixed“ amount which must be acquired by a firm in the short run, whether output is small or large.
- Fixed costs are also known as overhead costs and include charges such as contractual rent, insurance fee, maintenance costs, property taxes, interest on capital invested, minimum administrative expenditure such as manager’s salary, watchman wages etc.
- The following table and figure represent fixed cost.

Table- Fixed Cost	
Total Output (in units)	Total Fixed Cost (in Rs.)
0	100
1	100
2	100
3	100

- The above table shows when total output is zero, or increases and becomes 1, 2, and 3 or decreases and becomes 3, 2, or 1, total fixed cost remains fixed i.e., 100 Rs.

Figure-7.11



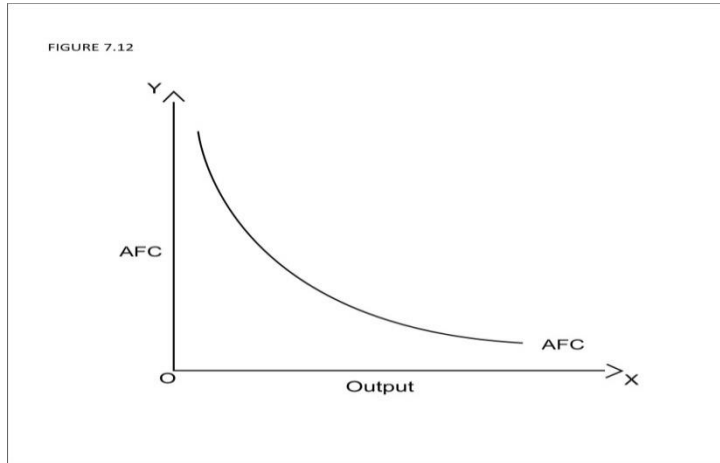
- In above figure, output measures on OX axis, and fixed cost measures on OY axis.
- The fixed cost is OF, when output is 0, OA or OB. Fixed cost does not change. The curve FF1 is parallel to OX axis.

Average Fixed Cost:

- Average fixed cost is the total fixed costs divided by the number of units produced.
- The following formula represent average fixed cost
- $AFC = \frac{TFC}{Q}$
- where AFC shows average fixed cost, TFC shows total fixed cost, Q shows the number of units of output produced.
- The following schedule and figure represent average fixed cost.

Table: Average Fixed Cost		
Total output (in units)	Total Fixed Cost	Average Fixed Cost
1	100	100
2	100	50
3	100	33.33
4	100	25

Figure 7.12



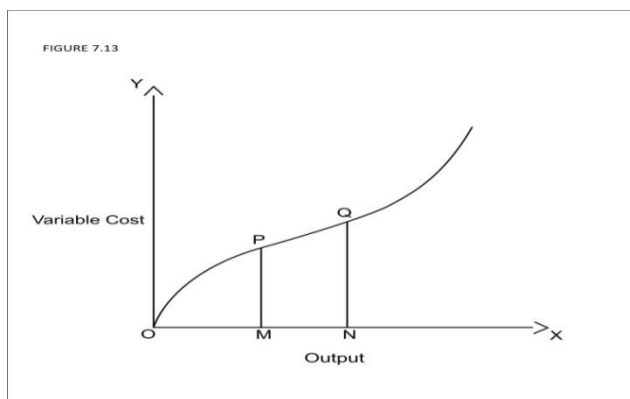
- It can be seen that average fixed cost curve slopes downwards. As number of units of output increase total fixed cost spreads more and more units and therefore average fixed cost becomes less and less.

❖ **Variable Cost**

- Variable cost are those costs which are acquired on the employment of variable factors of production whose amount can be altered in the short run.
- Therefore, total variable costs change with changes in output in the short run, i.e., increase or decrease when the output increases or decreases.
- This cost includes payments such as wages of labour employed, prices of raw material, fuel and power used, the expenditure incurred on transporting and the like.
- The following table and figure represent variable cost.

Table no.	
Total output (Units)	Total Variable Cost (in Rs.)
0	0
1	500
2	700
3	1000

Figure 7.13

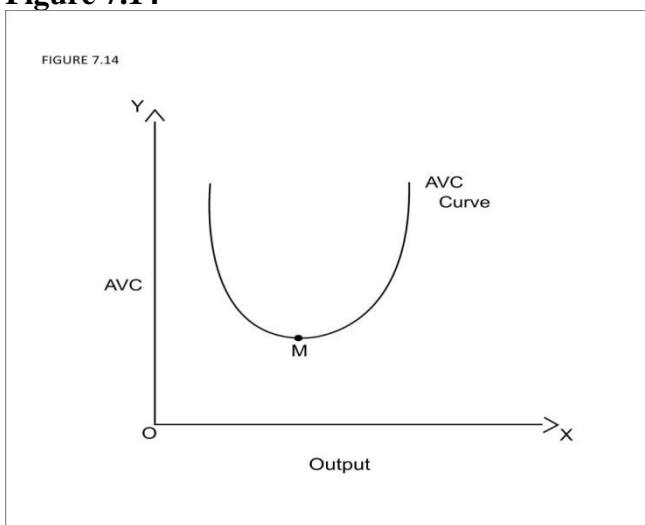


- The above figure indicates total variable cost curve in which variable cost has been taken on OY axis and output has been taken on OX axis. At OM output variable cost is PM, when output increases from OM to ON the variable cost also increases from PM to QM.
- It should be noted that at zero output there is no variable cost. Thus, variable cost passes through the origin.
- Variable cost is upward sloping, but initially at point M, its slope decreases gradually showing that marginal productivity of the variable factor is increasing, after M point, the slope of variable cost curve increases gradually showing that now that their marginal productivity is decreasing.

❖ **Average Variable Cost**

- Average variable cost is the total variable cost divided by the number of units of output produced.
- Average variable cost is the total variable cost divided by the number of units of output produced.
- Thus, $AVC = \frac{TVC}{Q}$
- Where AVC = Average Variable Cost, TVC = Total Variable Cost, Q = number of units of output produced.
- The following figure represent average variable cost.

Figure 7.14



- Average variable cost curve decreases in the beginning up to point M and

start increasing

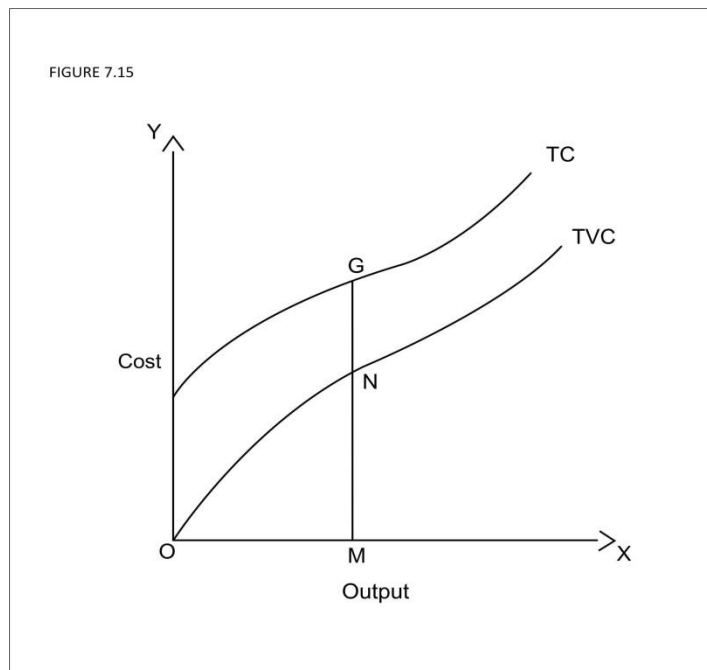
after this point. This is because in the beginning the output is below the normal production of the firm, as output increases and reaches the normal production, the variable cost per unit decreases till the point M where it is lowest, but when output increases beyond the normal production of the firm, the variable cost per unit increases speedily with an increase in output.

❖ **Total cost:**

- Total cost is the sum of total fixed cost and total variable cost at every level of output.
- The following diagram and schedule represent total cost.

Total output	Total cost
0	100
1	600
2	800
3	1100

Figure 7.15



- In the above figure VC is the variable cost curve while TC is the total cost curve.
- At OM level of output, MN is variable cost and GN is fixed cost and thus,

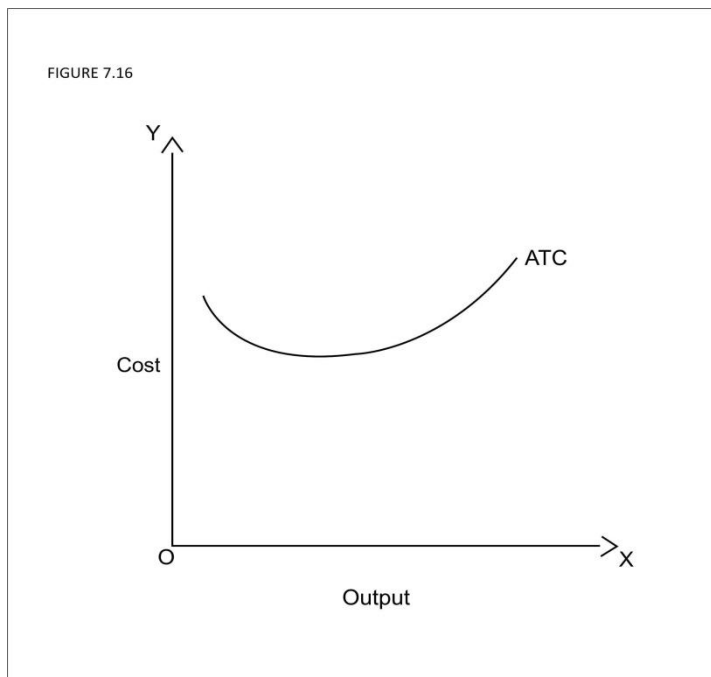
MG is total cost. And at any level of output vertical distance between TC and VC curve represent total fixed cost.

- It can be seen that TC curve is parallel to VC curve, it implies the behaviour of total cost is same as variable cost.

❖ **Average Total Cost**

- Average total cost is the sum of average variable cost and average fixed cost.
- Simply it can be defined as „average cost is the total cost divided by the number of units produced.
- The behaviour of ATC curve depends upon the behaviour of AVC and AFC curve.
- Thus, at output increases and average fixed cost becomes smaller and smaller, the vertical distance between the average total cost curve and average variable cost curve goes on decreasing.
- When, average fixed cost curve approaches the OX axis, the average variable cost curve approaches the average total cost curve.
- The ATC curve is therefore almost of a U shape. This has been illustrated in the following figure.

Figure 7.16

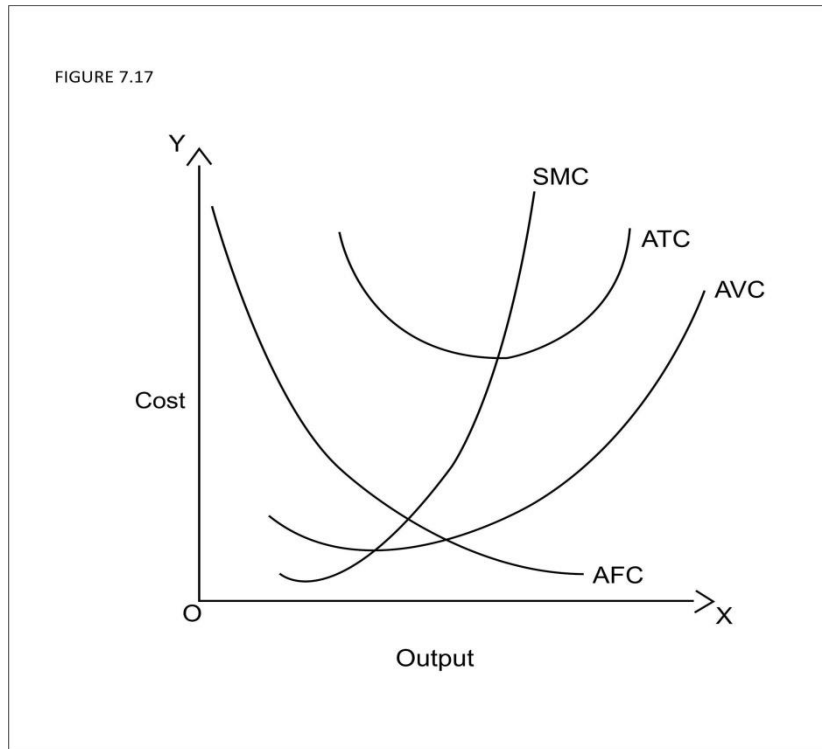


❖ **Short run Average Cost Curves**

- The following figure shows short run average cost curves i.e., average variable cost (AVC), average fixed cost (AFC), and average total cost

(ATC) and also SMC (short run marginal cost curve).

Figure 7.17



- It can be seen in the figure that average fixed cost curve continuously decreases throughout.
- Mathematically, it can be said that average fixed cost curve approaches both axes asymptotically. It implies that AFC curve gets very nearer to but never touches either axis.
- In the figure, average variable cost curve which first decreases, reaches a minimum and then increases.

❖ **Marginal Cost:**

- Marginal cost is an addition to the total cost caused by producing one more unit of output.
- It can be defined as „marginal cost is the total cost of producing n units instead of n-1 units, where n is any given number, symbolically, it can be shown as
 - $MC_n = TC_n - TC_{n-1}$
 - $MC = \frac{\Delta TC}{\Delta Q}$
- Where, ΔTC shows a change in total cost and ΔQ shows a unit change in output or total product.]
- In the total cost curve, $\frac{\Delta TC}{\Delta Q}$ indicates the slope of it.
- The following table shows computation of marginal cost.

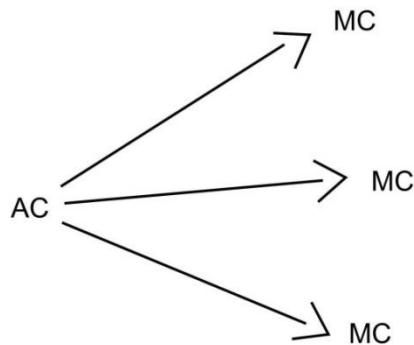
Output (Q)	Total Cost (TC)	Marginal cost $MC = \frac{\Delta TC}{\Delta Q}$
0	100	-
1	125	25
2	145	20
3	160	15
4	180	20
5	206	26
6	236	30

- Marginal cost is independent of the fixed cost. Fixed cost remains unchanged with output, there are no marginal fixed costs when output is increased in the short run.
- It is only the variable cost which vary with output in the short run.

❖ **Relationship between average cost and marginal cost**

- The relationship between the marginal cost and average cost is the same as that between any other marginal average quantities.
- The following figures illustrate relationship between average cost and marginal cost.

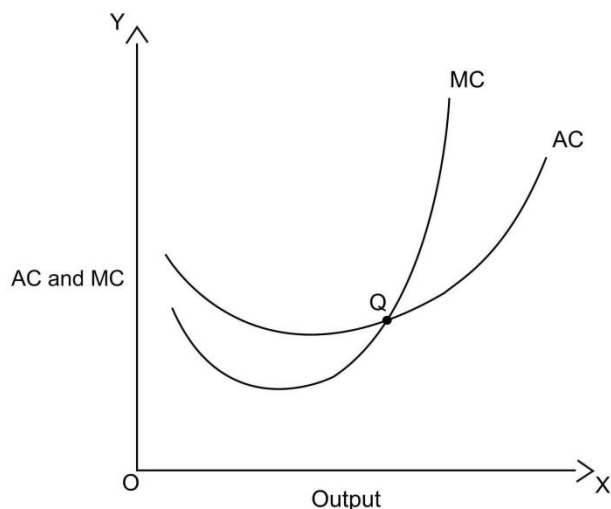
Figure 7.18
FIGURE 7.18



- It can be seen in figure that when marginal cost is above average cost, the average cost increases. It implies marginal cost pulls the average cost upwards.
- When marginal cost is below the average cost, average cost decreases i.e., marginal cost pulls the average cost downwards.
- If marginal cost is equal to the average cost, the average cost remains the same, that is, the marginal cost pulls the average cost horizontally.

Figure 7.19

FIGURE 7.19



- In above figure, when MC is above AC, AC is increasing
- When MC is below AC, AC decreases.
- At point Q, When MC is equal to AC, AC is minimum.

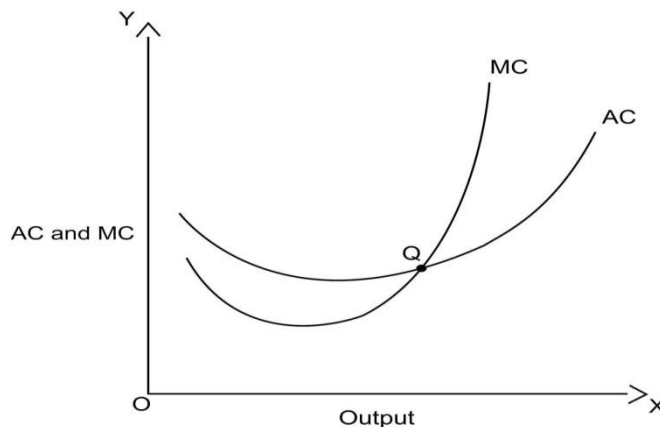
3. Short run and Long run Cost Functions:

Concept of Cost Function:

- The relationship between cost and output is expressed by cost function. By including prices of inputs into the production function, one finds the cost function since cost function is resulting from production function. Though, the nature of cost function depends on the time horizon. In microeconomic theory, we deal with short run and long run time.
- The cost function can be expressed as $Cq = f(Q, P)$. Where, Cq = Total cost production, Q = Quantity of inputs, P = Price of inputs.
- In the long run, all inputs are variable.
- In the short run, some of these inputs are fixed. Since the firm is controlled in the short run, and not controlled in the long run, the long run cost $TC(y)$ of producing any given output y is no greater than the short run cost $STC(y)$ of producing that output:
- $TC(y) \leq STC(y)$ for all y .

- In the case of short run, when the firm's input is fixed. Suppose that the firm uses two inputs, and the amount of input 2 is fixed at k .
- For many (but not all) production functions, there is some level of output, say Y_0 , such that the firm would select to use k units of input 2 to produce Y_0 , even if it were free to select any amount it required.
- In such a case, for this level of output the short run total cost when the firm is constrained to use k units of input 2 is equal to the long run total cost: $STC_k(y_0) = TC(y_0)$.
- We usually assume that for any level at which input 2 is fixed, there is some level of output for which that amount of input 2 is appropriate, so that for any value of k ,
- $TC(y) = STC_k(y)$ for some y .
- The following figure represents the relations between STC and TC .

FIGURE 7.19



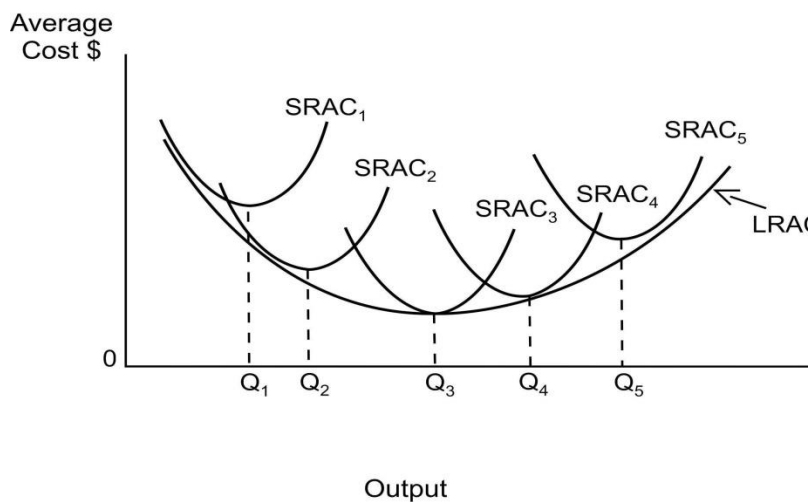
❖ **Cost function in the long run:**

- Cost function in Long- Run is defined as the mathematical relationship between cost of a product and the various determinants of cost. $C = F [Q, T, Pf, K]$

Long run cost of production is the least possible cost of producing any given level of output when all individual factors are variable.

Long run average cost curve:

FIGURE 7.21



- Long- run average cost curve shows the functional relationship between output & the long run cost of production.
- It envelopes the set of U- shaped short run average cost curves equivalent to different plant sizes.
- LRAC Curve is representing economies of scale when negatively slope & diseconomies of scale when positively sloped.

4. Cost Reduction and Cost Control:

❖ Definition of Cost control:

- The procedure of regulating and monitoring the outflow of resources is acknowledged as cost control. In simple words, it means to monitor/control the operating costs in a business firm is defined as Cost Control.

❖ Features of Cost Control

- Cost control process includes setting up of goals and ideals/Standards,
- Defining the actual performance, comparing the actual performance with the ideals/standards, exploring the discrepancies and taking remedial action.
- Goal to achieve the standard.
- Defensive function.
- Enhancement of Cost before acquisition thereof.
- Pertinence for the items/objects having standards.
- Inclusion of guidelines and directives for the control

❖ Process of Cost Control

- Planning: - Mainly a plan or set of goals is designed in terms of budgets and standards.

- **Implementation:** - The next step is to implement the plan by communicating to those who are responsible to implement the plan.
- **Inspiration:** - Inspiration or Motivation is defined as the process that inductees, leads and upholds the subordinates to achieve the goals.
- **Assessment and Reporting:** - Assessment of the performance of the subordinates is done through comparison of actual performance and the predetermined standards and they are reported to the superiors. Variations whether favourable or unfavourable are noted and in case of unfavourable variances corrective measures are taken to overcome them. Sometimes, standards are also revised depending upon the causes of variations.

❖ **Advantages of Cost control**

- Improvement in cost-effectiveness and competitiveness.
- Reduction in costs and consequently reduction in prices.
- Accomplishment of better throughput.
- Maintaining higher sales and thus employment of work force with stable and reasonable price

❖ **Disadvantages of Cost control:**

- Lessening in elasticity in a company
- Reduction in improvement in a company
- Constraint over innovation
- Requirement of skilled employees to set standards and targets

❖ **Factors affecting cost control in India**

- High cost of raw materials and other intermediate products
- High overseas commodity prices
- Power deficiencies
- Underutilization of installed capacity
- Delay in the issue of licenses
- High taxes

❖ **Techniques of Cost Control**

- Budgetary control
- Standard costing
- Inventory control
- Ratio analysis: A „Ratio“ is defined as an arithmetical association between two figures expressed in percentage terms as a proportion or as a rate. It is primarily used for comparing performance of an organization with the other organization in the industry.

→ Variance analysis: Variance is defined as the difference between the predetermined standard and the actual amount of costs or revenues. It is the examination of the reasons of variances. For example, if the

standard sales are Rs.50,000/- and actual sales are Rs.40,000/-, variance is of Rs.10,000/-. Causes for variations may be Changes in productivity, Change in product design, change in operating costs and overhead costs, Changes in working hours

❖ **Cost Reduction:**

- Cost reduction is the process of recognizing and eradicating unessential costs with a view to improve the profitability.

❖ **Features of Cost reduction**

- End result of the cost control process
- Improvement in the standards and targets
- Unceasing, dynamic and innovative process
- Innovating measures and alternatives to reduce costs
- Remedial function
- Relevant to each and every function of the management
- Analysis of management action at all levels

❖ **Techniques of cost reduction**

- Organization and methods
- Work study
- Material handling
- Automation Value analysis
- Variety reduction
- Production control
- Design Materials control
- Quality control

❖ **Comparison between Cost Control and Cost Reduction Comparison Chart**

Points for Comparison	COST CONTROL	COST REDUCTION
Meaning	A technique to maintain the costs as per the set standards	A technique to cut down the unit cost without sinking the excellence of the product
Aim	Savings in Total Cost	Savings in Cost Per Unit
Withholding of Quality	Not Definite	Definite
Nature	Provisional	Perpetual
Stress on	Past and Present Cost	Present and Future Cost
Last Stage of the Process	Achievement of the pre-determined target	No end because of Perpetual nature
Measure	Precautionary	Remedial

❖ **CHECK YOUR PROGRESS**

1. Answer the following questions

1. Give the meaning of production and factors of production. Classify the factors of production.
2. Define production function and state significance of the production function.
3. Write a note on linear homogeneous production function.
4. Explain the law of variable proportion with figure.
5. Explain the concept of isoquants and discuss its properties.
6. Discuss long run production function.
7. Write a note on Cobb-Douglas production function.
8. Explain the following concepts of costs.
 - a. Opportunity Cost
 - b. Explicit Cost
 - c. Real Cost
 - d. Implicit Cost
 - e. Money Cost
9. Describe cost function.
10. Discuss fixed cost, variable cost and total cost with illustrations and figures.
11. Give the meaning of marginal cost and explain relationship between average cost and marginal cost.
12. Distinguish between cost reduction and cost control.

2. Multiple Choice Questions

1. **Factors of production are classified into ___ categories.**
 - a. 1
 - b. 3
 - c. 2
 - d. 4
2. **The law of variable proportion is also known as ___.**
 - a. Law of diminishing marginal returns
 - b. Long run production function
 - c. Constant returns to scale
 - d. None of the above

Ans: a. Law of diminishing marginal returns

3. **_____ shows the relationship between input and output under condition of given technology.**
 - a. Cost function
 - b. Production function
 - c. Both (a) and (b)
 - d. None of the above.
4. **_____ indicates all those input combinations which are capable of producing the same level of output.**
 - a. Isoquant
 - b. Iso cost
 - c. Production
 - d. Cost

5. Isoquants curves are _____ to origin.
 - a. Concave
 - b. Convex
 - c. Round
 - d. Parallel
6. Higher Isoquant represents ___ level of satisfaction.
 - a. Lower
 - b. Equal
 - c. Higher
 - d. None of the above
7. Marginal rate of technical substitution of labour for capital is defined as the number of units of capital which is replaced by one unit of labour, the level of output remaining _____.
 - a. Unchanged.
 - b. Constant
 - c. Greater
 - d. Lower
8. _____ is also called linearly homogeneous production function or homogeneous production of the first degree.
 - a. Increasing Return to Scale
 - b. Constant return to scale
 - c. Decreasing return to scale
 - d. None of above.
9. If output increases more than proportionately, it is the case of ____.
 - a. Increasing Return to Scale
 - b. Constant return to scale
 - c. Decreasing return to scale
 - d. None of above.
10. If output increases less than proportionately, we have a case of ____.
 - a. Increasing Return to Scale
 - b. Constant return to scale
 - c. Decreasing return to scale
 - d. None of above
11. are the pains and inconveniences experienced by labour to produce a commodity.
 - a. Real costs
 - b. Money cost
 - c. Explicit cost
 - d. Implicit cost
12. of anything is the alternative that has been foregone.
 - a. Real cost
 - b. Money cost
 - c. Opportunity cost
 - d. Explicit cost
13. In the long run, all factors are _____.
 - a. Variable
 - b. Fixed
 - c. Constant
 - d. None of the above.
14. Fixed costs are those costs which are.....of output.

- a. Dependent
- b. Independent
- c. Greater than
- d. Lower than

15. _____ is the total fixed costs divided by the number of units produced.

- a. Average fixed cost
- b. Variable fixed cost
- c. Average cost
- d. Marginal cost

16. when marginal cost is above average cost, the average cost ____

- a. Increases
- b. Decreases
- c. Remains stable
- d. Becomes unstable

17. The process of identifying and eliminating unnecessary costs to improve the profitability of a business is known as ____.

- a. Cost control
- b. Cost reduction
- c. Both (a) and (b)
- d. None of the above

18. The process of regulating and monitoring expenditure of funds is known as.....

- a. Cost control
- b. Cost reduction
- c. Both (a) and (b)
- d. None of the above

MCQ Answer

1	2	3	4	5	6	7	8	9	10
d	a	b	a	b	c	a	b	a	c
11	12	13	14	15	16	17	18		
a	c	a	b	a	a	b	a		

8.0 INTRODUCTION**8.1 PRICE DETERMINATION UNDER PERFECT COMPETITION****❖ CHECK YOUR PROGRESS**

8.0 Introduction

Price determination means determining the cost of goods sold and services offered on the freemarket. In the free market, demand and supply forces determine prices.

The government does not interfere with pricing. However, in some cases, the Government may intervene in setting prices. For example, the government has set a minimum price for wheat sales.

❖ Meaning:

Price is the purchase price of a limited amount, weight, or other match for goods or services. In other words, it also reflects the amount of goods produced and the services provided by the production facilities such as land, labour and capital. Therefore, pricing is very important for the economy.

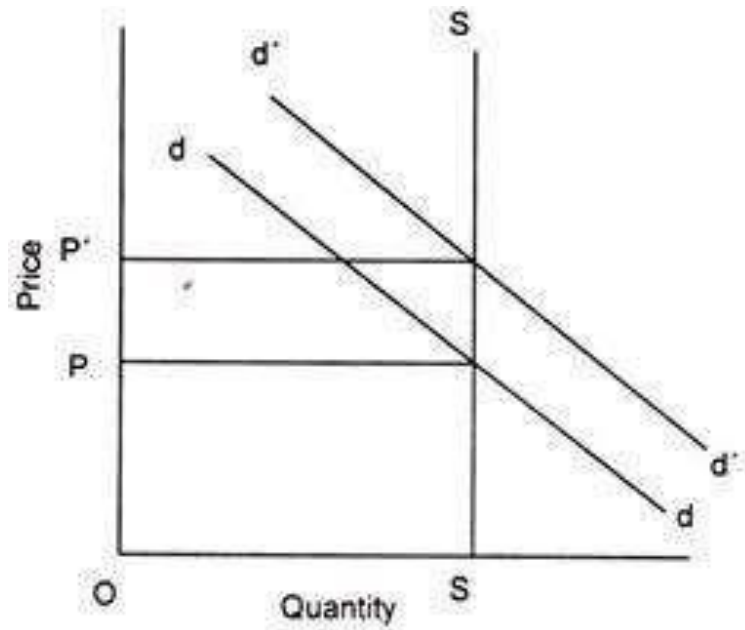
8.1 Price determination under perfect competition

- (a) Market Period
- (b) Short Run
- (c) Long Run
- (d) Market Period

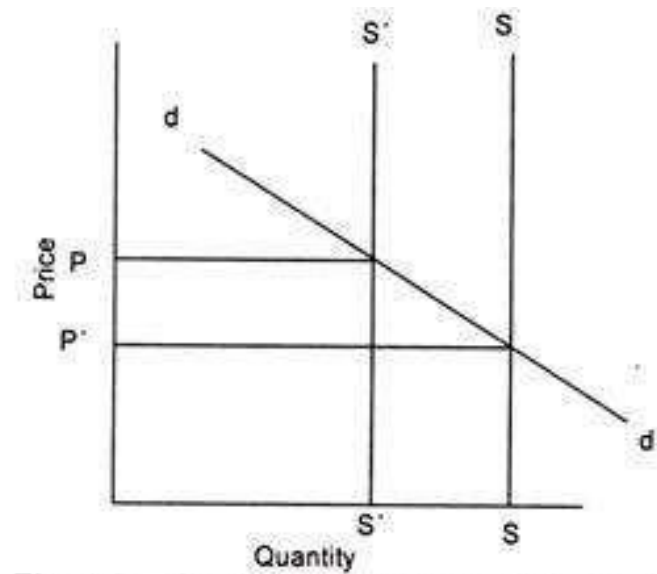
In market times, the length of time is so short that no firm can increase its production. The total amount of goods in the market is limited. Market time can be an hour, a day or a few days or even a few weeks depending on the type of product.

For example, in the case of decaying substances such as vegetables, fish, eggs, time can be a day. Since the acquisition of perishable goods is limited to the amount of available or stock on the day that cannot be increased or withdrawn in the future, all must be sold on the same day, regardless of price.

The following figure shows that the curve for the supply of perishable goods such as fish is not fully aligned and takes the form of a straight line directly to the SS. Let us assume that the curve of fish demand is provided by dd. The turn of the curve and the curve of the curve intersect at one point R, determined by the OP value. If the demand for fish suddenly increases, it removes the need for a curve up to d “.



Conversion point from R to R'' and the price rises to OP'. In this case, the price is determined only by the demand condition of the active agent.



Similarly, when supply of a product demand, as indicated in the SS demand curve in Figure When product supply drops abruptly from SS to S'S, the price increases from P to P'. Please reframe this sentence to make it more meaningful In this case the price is determined by the supply, the feed being the active agent.

In this case the moving curve left to the left creates an increase in the price of reduced commodities. Given the demand dd curve and the provision of the SS curve, the price is determined by OP. The need curve remains the same, the feed curve shifts the feed curve to the left to S'S. As a result, the price increases from OP to OP'.

The curve of the intangible but fulfilling material will not be a straight line for the entire

length. This is for certain goods that can be marketed if the price is too low as the seller will not sell any of the goods at the current market and would like to hold the entire stock.

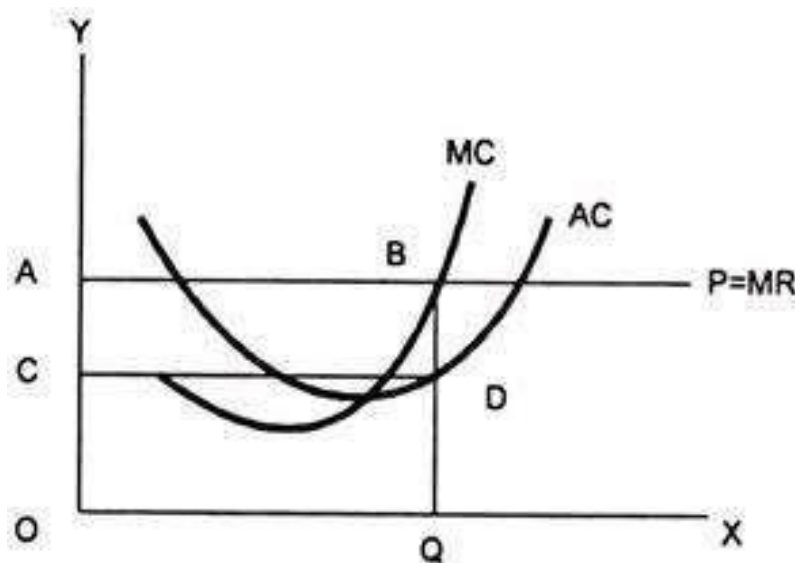
The lower price at which a seller refuses to give up any amount of his product is known as the „booking price“. Therefore, the seller is subject to two extreme price levels; in one case he is ready to sell all the stock and in another he refuses to sell any. The price he offers for sale will vary in price.

The seller will be willing to pay more than the minimum wage based on low expectations. The seller's supply chain, therefore, will move upwards to the right until the price you are willing to sell in all stocks. Beyond this point, the feed curve will be a straight vertical line at any price.

❖ **Pricing in the Short Run- Equilibrium of the Firm:**

The short term is so short that existing plants cannot be expanded and new plants cannot be built to meet growing needs. However, time is not enough for producers to somewhat adjust their product to growth in demand by overworking their dynamic plants. Over time, therefore, the supply of curves expands.

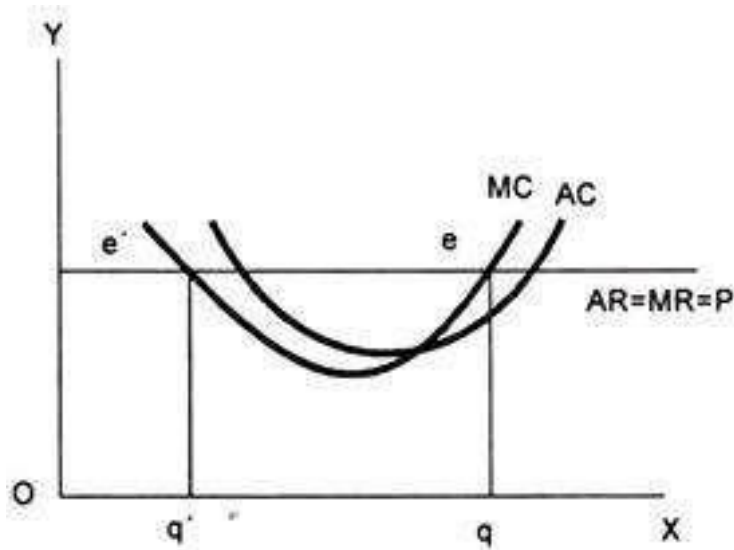
Figure shows the estimated cost of the firm's firm and small costs and its demand curve. The demand curve, in a fully competitive market, is also a middle income curve and a limited factory curve. Side costs exceed normal costs at their lower cost. The U-shape of both cost curves reflects the law of equitable dynamics in the short term when the crop



size is constantly adjusted.

The company offers OQ releases. QC is a general cost and the firm earns a total profit equal to the area indicated by ABCD. The firm increases its profits. At the beginning of the equity point, a company does not earn a high profit as each additional unit of product brings more revenue at its own expense. Any output rate greater than OQ brings in less revenue than side costs.

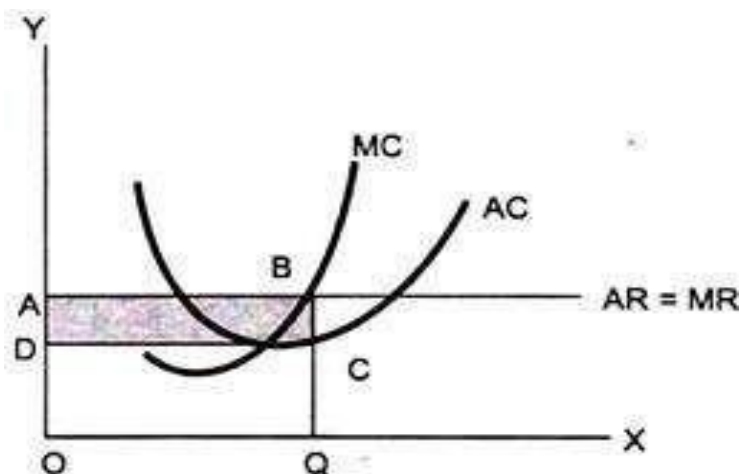
For the equilibrium of a firm the two conditions must be fulfilled:



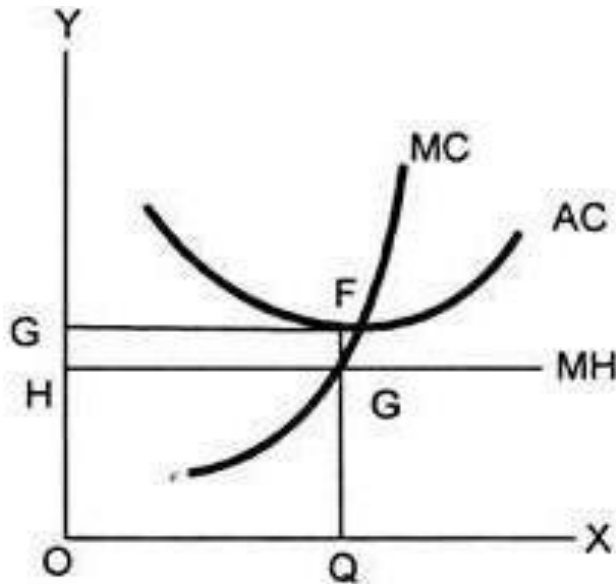
- Additional costs must be equal to the additional costs. However, this situation is not enough, because it can be fulfilled but the company may not be in balance. Figure 4.4 WHERE IS FIGURE 4.4 ??? shows that side costs are equal to the net income in e', however the firm is not in the balance as the output of the Oq is greater than the Oq'.
- The second necessary condition of equity requires that the extra cost curve cut the lower estimated cash flows from below which means the separate expense curve rises in the junction with the sidebar.

Therefore, a fully competitive company will adjust its output when its side costs are equal to the revenue or side value, and the lower cost curve cuts the separate curve from below.

Just because a firm is in equilibrium does not mean that it is actually making a huge profit. In the equivalent of part-time companies they may earn too much profit, general profits or they may lose.

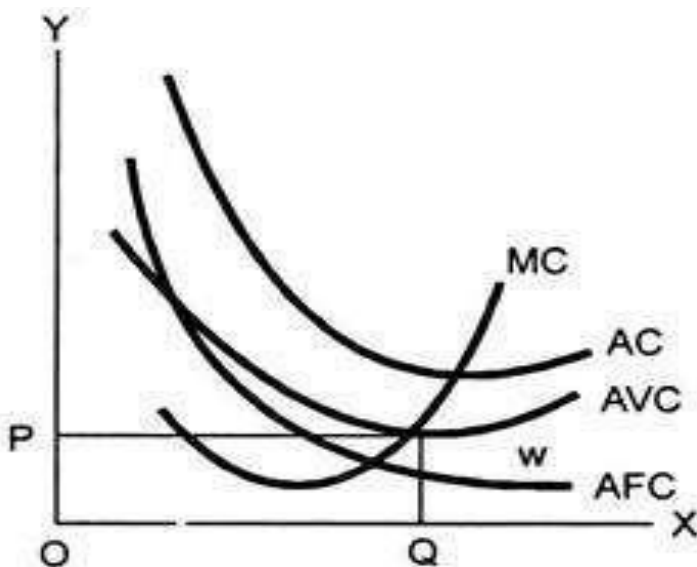


Whether a company makes excessive profits, general profits or gains losses depends on the level of general costs over the short term equity. If the average cost is less than the average income, the firm receives higher than the potential benefits. Figure shows that the average cost QC is less than QB's revenue, and the firm earns a profit equal to the area of ABCD.



If the average cost is more than the average income the firm makes a loss. Figure shows that Medium QF costs are higher than QG Medium revenue and the firm is making losses equal to the EFGH shade zone. In this case the firm will continue to produce only if it is able to cover its variable costs.

Otherwise it will close, because by ceasing to operate its firm is better; reduces its loss. The point at which a firm incorporates its variable costs is called the „closing point“. If the price falls below or the average cost rises, the firm does not pay its variable costs and is better off when it closes. Figure 4.7 WHERE IS FIGURE 4.7? explains the closing point.



❖ Sector/Industry Equality:

The industry is equal to that price when the value of demand is equal to the value provided.

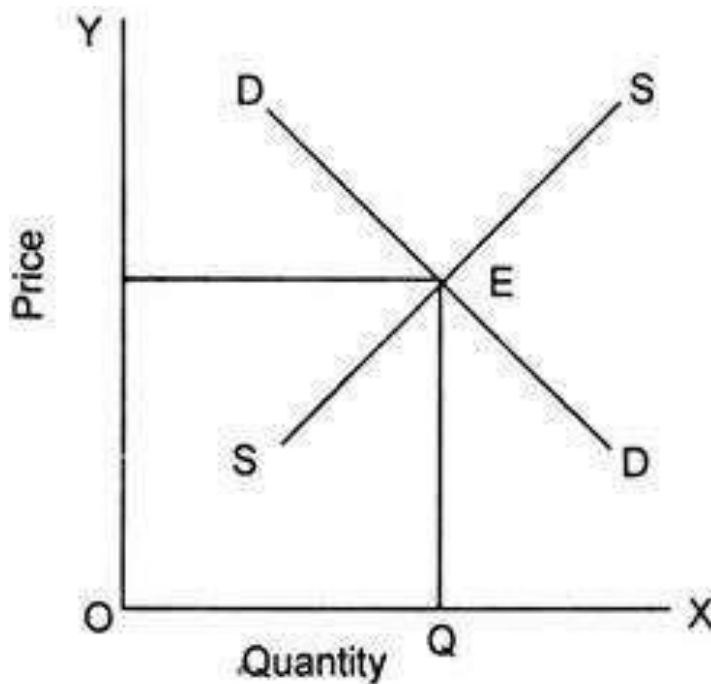


Figure explains that DD is a required industry and SS is a supply industry. Point E where industry demand and industry supply are equal, the OP value is determined. OQ is the required quantity and quantity provided. This is, however, a short-term equation when at a fixed price in the market some firms are likely to make huge profits, general profits or losses. Over time firms may not continue to incur losses. Loss that makes factories unable to repair their crop will be closed.

Companies that make more money than they can afford will increase their potential. At the same time new firms will be drawn into the industry. The free movement of factories within and outside the industry and the refurbishment of existing firms in the industry will establish a long-term equity in which firms will be earning normal profits and there will be no tendency to enter or leave the industry.

❖ Pricing in the Long Run

Long-term is long enough to allow for flexibility and flexibility. Over time, appropriately, everything becomes different and untouched. So, over time, firms can change their output by expanding their repaired equipment. They can grow old plants or replace new ones with new ones or add new ones.

In addition, over time, new firms may re-enter the industry. Conversely, if the situation demands it, over time, firms can reduce their planned assets by allowing them to age without replacement and the existing company can leave the industry.

Therefore, long-term equity will refer to a situation where an open and complete corrective space is allowed in economic power. Over time, it is the run-averages and low-cost curves that are relevant to decision-making. In addition, over time, the standard variable costs are less effective. The estimated total cost determines the value, because over time all costs vary and there is no set cost.

In the short term the company under full competition is limited to its output where the

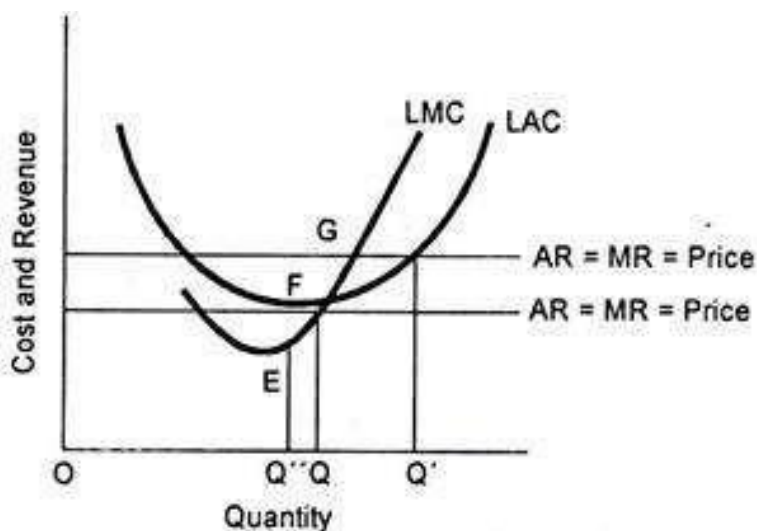
side costs are equal to the price or Marginal Revenue. This works equally well over time. However, over time for a fully competitive company to be standardized, with the exception of side costs equal to the price, the price must also be equal to the average cost. If the value is greater than the average cost, the firms will be making more profits.

Attracted by this huge profit, new firms will enter the sector and this additional profit will be contested and removed. When new firms enter the sector, supply or output of the sector will increase and therefore the price of the product will be enforced. New firms will continue to enter the industry until the price is down to normal costs, and all firms receive only normal profits.

On the other hand, if the price falls below the normal cost, the firms will lose out. Some existing firms will abandon the sector. As a result, the productivity of the industry will decrease and the price will rise to equal the normal costs for the remaining firms in the sector to make a regular profit. Therefore, over time, firms do not need to be forced to produce at a loss because they could leave the industry, if they lose. Therefore, in order for a fully competitive company to be balanced over time, the price must be commensurate with the minimum and medium costs.

Now when the normal cost curve goes down, the side cost curve is below it, and when the intermediate cost curve rises, the extra cost curve should be above it. Therefore, the side costs can only be equal to the average cost only if the normal cost curve does not fall and do not rise, which means in the lower area of the normal cost curve. So, there is a low level of medium cost, and both are equal there.

Price = Marginal Cost = Minimum Average Cost.



The conditions for the long-term equity of a firm under complete competition can be easily understood from Fig., where the LAC is a long-term cost shift and the LMC is a low-cost moving average. A firm under full competition cannot be equated over time with the price of OP' , because even though the value of OP' is equal to the MC at G (i.e., at the OQ exit) it is larger than the average cost for this output and, therefore, the company will be earning excessive profits.

Since all firms are thought to be the same, they will all be earning huge profits. Therefore, it will attract new firms to enter the sector. As a result, the price will be forced down to

the Op level where the price, the firm is in equilibrium at F and is Production OQ” output.

In F or equilibrium output OQ”, the price is equal to the average cost, which is why the firm will only earn a normal profit. Therefore, at the OP price, there will be no tendency for foreign firms to enter the sector. Therefore, the firm will be on par with the OP price and OQ output.

On the contrary, a company under absolute competition cannot be a long-term equator at the price of OP”. Although the price of OP” is equal to the cost of side by E, or OQ issued“ but the price of OP” is less than the normal cost at this point and thus the company will incur losses.

Since all firms in the industry were the same in terms of price costs, everything would be at a loss. To avoid this loss, some companies will leave the industry. As a result, prices will rise in OP, where all firms make a regular profit. When the OP price was reached, firms would have no other tendency to quit.

Therefore, to conclude that at the price of OP, the company under full competition is on average over time when:

Price = MC = Minor AC

Now, at the price of OP, with the exception of all OQ emissions firms, the industry will also be in balance, as there will be no tendency for new firms to enter or existing firms to leave the industry, because everything will be getting a normal profit. Therefore, at OP price, full equity, which means equity for all individual and sector firms, as a whole, is achieved over time under complete competition.

Under Monopoly every retailer wants to earn the highest profit.

This fact Prof. Marshall said one person wanted to acquire the "Mainum Please check Monopoly Gain" by selling his goods.

This is what Mrs. Robinson said as the Net Monopoly Revenue.

Now, the important question arises as to how a monopolist should adjust its price, in order to make a higher profit? At this point the two economists listed above have the view that pricing under state conditions is similar to that of total competition.

The only difference is that in a complete competition the middle curve and the income sideways are the same and the same as the X-axis where as in Monopoly these curves are lower curves. Monopolist behaves like a firm. His goal is to increase profits and if there is a loss, then to reduce losses. Profit is increased when side costs are equal to side income. Losses are small when the side costs are equal to the income but after that the side costs must increase.

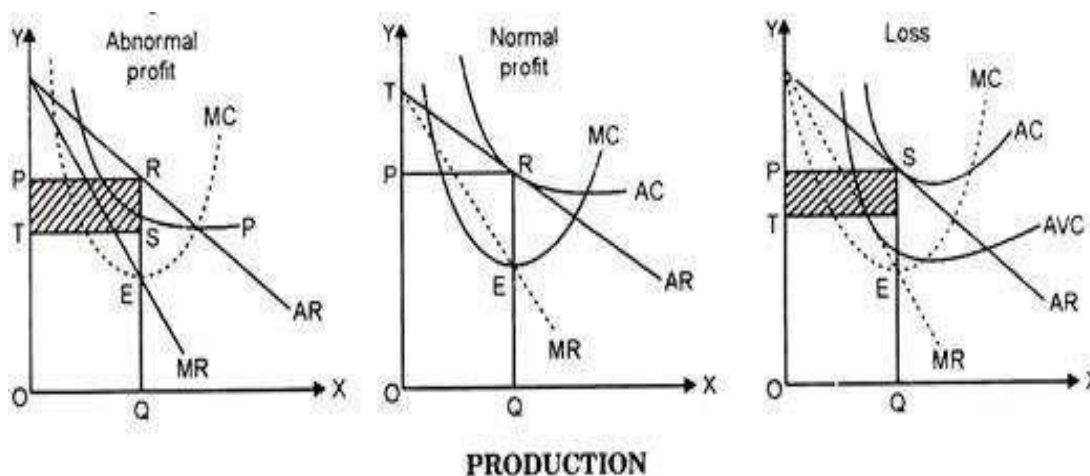
Monopolist being the sole producer and seller of such property may determine its value and quantity for its production or sale. He cannot do both. Either you adjust the price and leave the output determined by the consumer's demand for that price or you can adjust the output to be generated and leave the price to be determined by the consumer demand for his product. But it is a common experience that you leave the price on the market and determine the value of the output. In any case, he will be ready to face the loss.

If, in the short term, the cost of production of the asset is zero, you will continue to produce until the level or for a very long time the separate income from the sale of that asset does not exceed zero. As soon as the sidewalk is zero it will not increase its supply.

Some economists speculate that, in a short period of time, three different situations may arise before one person.

- (i) When the monopolist earns abnormal profits,
- (ii) When he gets only normal profits, and
- (iii) When he suffers losses.

❖ The explanation and diagrams of these situations are given below:



In point E the firm is in equilibrium when $MC = MR$. After that the MC curve begins to rise. Under this scenario, OP is a value and OQ is the total production of an asset determined as such. To calculate gain or loss, we will need to measure the difference between AR and AC. If $AR > AC$, the difference between this is profit per unit and multiplying by the total number of units produced we can get the full benefit.

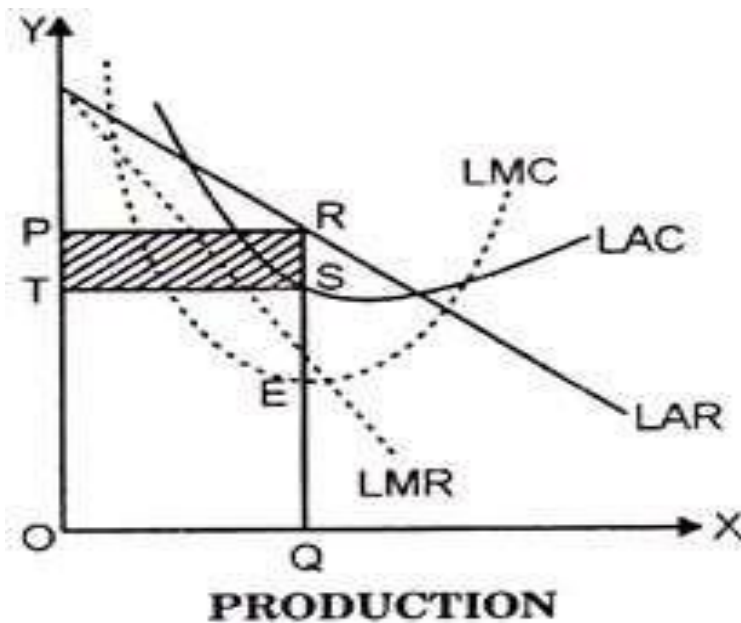
In the first calculation $RQ = OP$ is the price, TO the cost of production per unit. Therefore, $RS = PT$ is the unit of profit. With most OQ production, the total profit is the area tied to PTRS which is a rare gain. In the second calculation $RQ = OP$ is the fixed price and RQ is thenormal cost. Under this scenario, there will only be a normal profit.

In that calculation three prices per $RQ = OP$ but the cost per unit is SQ. Therefore, SR (TP) is a loss per unit. As a result the shadowy area of TPRS will be a complete loss. But this loss is short-lived. In the long run, these losses will disappear, under this condition and situation, only gains will be made.

❖ **Long-term pricing:**

For a long time the monopolist introduced changes to his machinery and production strategies. During this time to maximize profits, he will adjust the efficiency and strength of his resources according to his needs. But the determination of product quantity follows, the same line as in the short term.

This is clear from the following figure:



In this figure the LMC and LMR meet in the E area and after that the LMC continues to rise. Therefore OQ production is determined and OP is priced. But the average cost is SQ. So the profit per unit is RS and in OQ the total profit is PTSR.

Under Competitive Price $AR = MR$, where-as under Monopoly $MR < AR$.

Under the full competitive price is determined the full demand for supply and supply. This price is acceptable to all firms in the industry. No company can change this price. Therefore, median income and marginal income, at all levels of production, will remain constant and equal. Its curves are X-axis.

Under Monopoly, sales of all additional unit units of goods will have to decrease. In this way, with the sale of every additional unit, the average revenue and side rate continues to fall. But the average decline in revenue is slightly sharper than the decrease in payroll, because the income limit is limited to one unit, and in the event of an average income, the discounted price is divided by the number of units. Therefore, the fall in the middle income has a sufficiently low slope. That is why lower income is less than average income.

❖ **Price-Output Equilibrium under the Monopolistic Competition: Equality in Short-Run and Long Run!**

Under the competition for independence, organizations need to make major changes in prices and outputs sold to achieve equity.

Apart from this, under independent competition, organizations also need to pay attention to product design and how the product is promoted in the market.

In addition, an organization under the competition for commitment is not only required to learn about individual equality, but group equality for all organizations present in the market. Let us first understand each organizational equality under independent competition.

As we know that every retailer, regardless of market structure, is determined to maximize

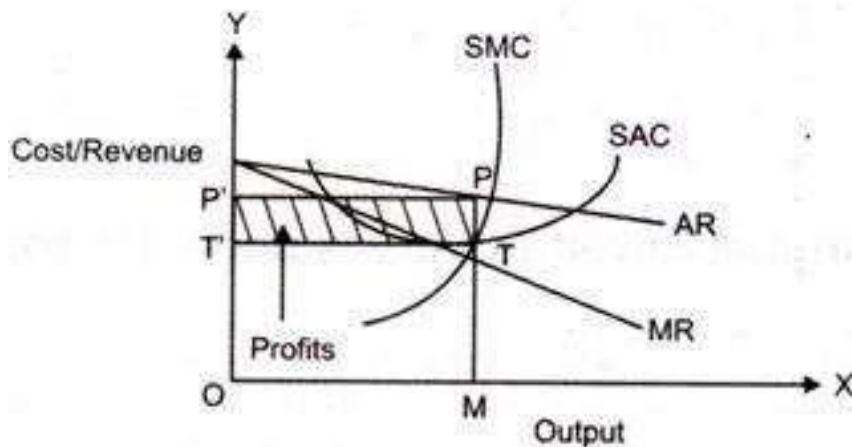
its profits. In an independent competition, profits are increased at a time when income is equal to side costs. The price determined at this point is known as the equation price and the result produced at this point is called the equity output.

If the seller's income exceeds the maximum cost, he may arrange to increase his earnings. On the other hand, if the minimum wage is less than the total cost, it would be beneficial for the seller to reduce the output to a level where the revenue is equal to the separate costs.

❖ **Equilibrium in Short Run:**

The short-term equality of the competition for all is the same as that of the monarchy. Over time, a private equity organization gets its own equity where the income stream is equal to the side costs and sets its price according to its desired curve. This means that over time, the profit is increased when $MR = MC$.

Figure shows the equilibrium in the short run:



In Figure, the AR is the standard income curve, the MR represents the side financial curve, the SAC curve represents the short-term common cost curve, while the SMC indicates the minimum limit cost. In Figure, it can be seen that MR disconnects SMC from OM output when the value is OP' (equivalent to MP). This is because the P is the point at the corner of the AR, which is the price.

From Figure, it can be interpreted as an organization earning a very large profit. The average gain per unit of output is the difference between the average income and the average cost. In Figure, the average income in the equity area is MP and the average cost is MT.

Therefore, PT is a great advantage in terms of each output unit. In the present case, the average gain will be measured by P'PTT' rectangle (which is a multiplied result with excess profit per unit output).

On the other hand, when side costs are greater than side income, entities may incur losses, as shown in Figure:

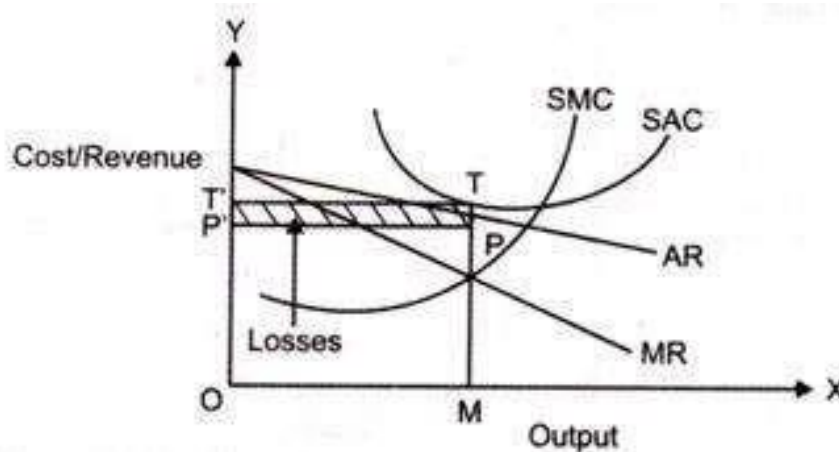


Figure shows the state of short-term loss under independent competition. Here, OP' is less than MT , which means that the average income is less than the average cost. TP represents the losses that have been per unit output. The total loss is therefore shown from the $T'TPP$ rectangle.

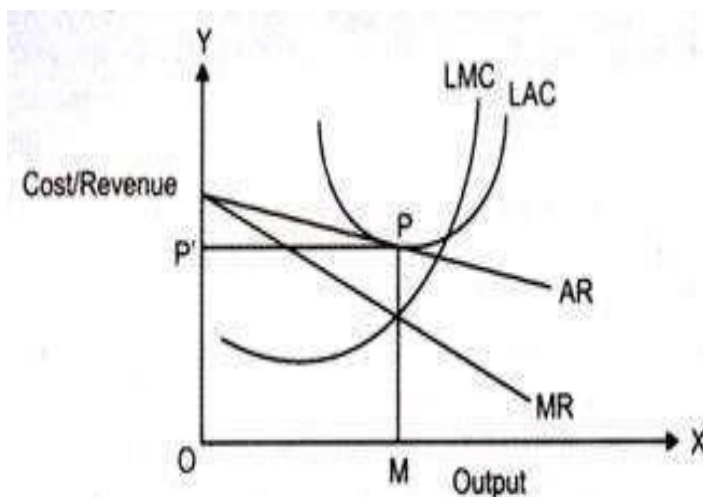
❖ **Equilibrium in Long Run:**

In the previous sections, we discussed that in the short term, organizations can reap enormous profits. Over time, however, there is a gradual decline in organizational profits. This is because over time, several new organizations enter the market because of the freedom to enter and exit the competition.

When these new organizations start producing offers will increase and prices will decrease. This will automatically increase the level of competition in the market. As a result, the turning of the AR curve from right to left and the excess gain is added to another standard gain.

Over time, the AR curve is much more flexible than the short-term one. This is due to an increase in the number of replacement products over time. The long-term equity of independent competing entities is found when the average income is equal to the average cost. In such a case, the organizations receive a general benefit.

Figure shows the long-term equity position under the co-operative competition:



In Figure, P is the point at which the AR curve affects the cost curve (LAC) as a tangent. P is considered a measurement area where the price level is MP (also equal to OF) and the output is OM.

In the present case the equivalent cost is equal to the median income of MP. So, over time, the general profit. Over time, equity is found when the marginal income is equal to side costs. However, over time, both conditions ($MR = MC$ and $AR = AC$) should be held to determine equity.

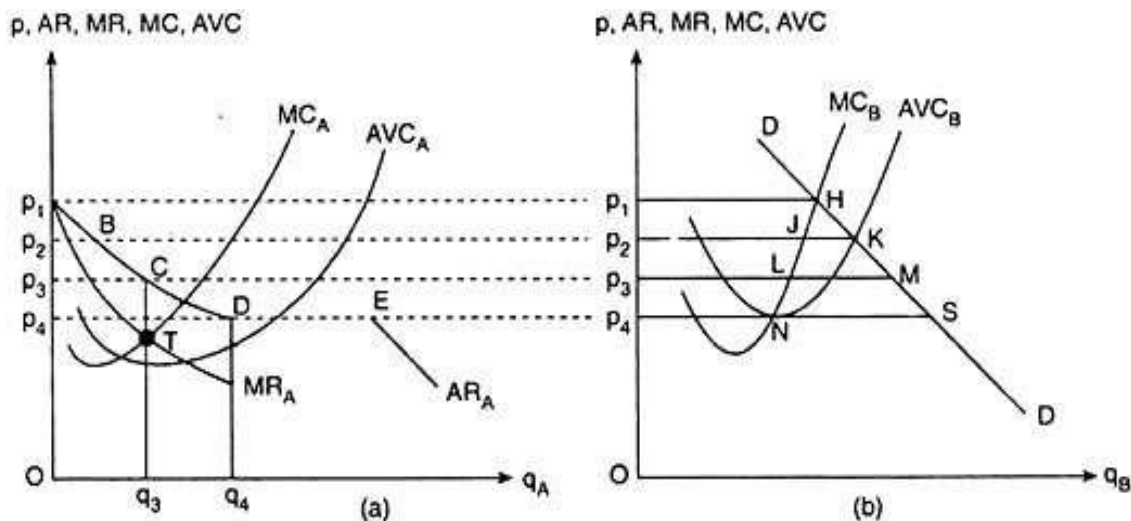
❖ **Price leadership in duopoly**

In the price guidance model, there is one industry-leading company that adjusts the product price and all other firms accept that price and determine their value accordingly.

The simplest case of price leadership under the following assumptions:

- (i) There are two independent firms,
- (ii) Produce complete replacement products,
- (iii) The product is available for immediate sale,
- (iv) Many consumers are familiar with the product,
- (v) Every duopolist knows the curve of market demand for a product,
- (vi) The purpose of each company is to increase profits in each period,
- (vii) Duopolist A assumes that B will always charge the same amount as he (A) corrects, and B actually does this, that is, here duopolist A is the price leader and B is the price follower. We can now explain the performance of the model with the help of Fig.

In Fig. (b), DD turns product demand, and MCB and AVCB are intermediate price variables and, respectively, of duopolist B, price follower, and Fig. (a), MCA and AVCA are moderate and moderate variables of duopolist A, the price leader.



Now, for each price A fixes and B receive, B will produce and sell its profitable value and A will produce an amount equal to the difference between the demand for the product at the price set by A and the quantity produced and sold by B, as long as the difference is correct. For example, if A corrects the price in Op_1 per unit, B will accept that price as it is randomly assigned and will generate and sell the p_1H value each time. This is his profit margin because in this size his MC is equal to the price (e.g., Op_1).

Now, as shown in Fig. (b), p_1 equals market demand in $p = Op_1$. Therefore, there is nothing in the market left to duopolist A in $p = Op_1$. So at this price, the output of A will be equal to zero, and point p_1 to the direct axis in Fig. (a) becomes a point in the quest for duopolist A.

Similarly, for Op_2 , Op_3 and Op_4 prices, the results of increasing B profits can be p_2J , p_3L and p_4N , respectively, and, as A accepts these positions, you will be able to sell at these prices, JK, LM and NS, respectively.

These values are equal to p_2B , p_3C and p_4D in Fig. (a), that is, at the prices of Op_2 , Op_3 and Op_4 , duopolist A will be able to sell the price of p_2B , p_3C and p_4D . Therefore, points B, C and D, and as a point p_1 , will lie in the dome of duopolist A demand, so his quest will be found as a p_1BCD curve.

But this is just one part of the curve. With Op_4 prices, there will be a discontinuation in the queue for duopolist A. This is because Op_4 is equal to $AVCB$ and, if the price falls below Op_4 , the release of duopolist B will be reduced to zero, because he would not be able to get even the cost which change over time.

Therefore, with $p < Op_4$, the market demand curve itself will be the demand curve for duopolist A. To be more precise, the duopolist A turn curve turns into two-dimensional $p-Op_4$, his turn curve will be part of p_1BCD ; at $p = Op_4$, there will be a suspension - from point D to point E - turn desired; and in $p < Op_4$, the market demand curve itself will be his demand curve or the AR curve - this is part of the EAR_A demand curve.

So, I found a curve for the need for a price leader, i.e., duopolist A. Now, the MRA curve in Fig. (a) is part of the curve of M. $AR-MR$ relationship with the A's duopolist A's turn. Given the curves of the MRA and MCA , we can quickly see the point of equality of the price leader, i.e., the duopolist A, to point T in Fig. (a).

This point, which is the point of intersection of the MRA and MCA curves, indicates that A must set a product value in Op_3 .

As the price leader A set the price on Op_3 , the follower, i.e., the duopolist B, will accept the price and, at this rate, subtract its profit into p_3L in Fig. (b). His combination of price-production increases, therefore, will be (Op_3, p_3L) in L-area, and duopolist A will be left with the remainder of the market demand in $p = Op_3$.

This section is LM in Fig. (b), or, $p_3C = Oq_3$ in Fig. (a). Duopolist A, at the time, would occupy the C-spot ($p = Op_3$, $q = Oq_3$) in his quest. From the combination of price demand, C (Op_3 , Oq_3), the MR of the duopolist M equal to his MC , will be able to maximize profits from this combination, or, he will be in balance if he sells the product Oq_3 at the Op_3 price.

The simple model we discussed above helps us understand the economics of price leadership. More complex models can be built by increasing the number of firms, by introducing product divisions or by changing relationships between the costs of different firms. But they would not add much to the economics of price leadership.

If in the oligopolistic industry, there is a large company and a few small firms, then it is very likely that a large company will succeed in placing some kind of price guidance on small firms. It could be the result of a peace treaty. However, if the oligopolists are about

the same size, the leadership agreement is likely to be based on solid foundations rather than a peaceful one.

Price Leadership: Meaning, Type and Advantage of Price Leadership

Another way to work together is price leadership. In this system of oligopolists 'behavior one company sets the price and others follow it because it is profitable for them or because they prefer to avoid uncertainty about their competitors' responses even if this means the departure of the fans instead of making a profit.

Price leadership is widespread in the business world. It can be done by explicit agreement or informally. In almost all cases, price controls are silent because open bargaining agreements are illegal in many countries.

Pricing leadership is more widespread than retailers, because it allows members to complete freedom in relation to their product and their marketing activities, so it is more acceptable to fans than to a complete organization, which requires the granting of all freedoms to work in the middle company. If the product is the same and the firms are more focused on the area the price will be the same. However, if the product is divided the prices will be different, but the indicator of their change will be the same, while the same price differences will be more widely maintained.

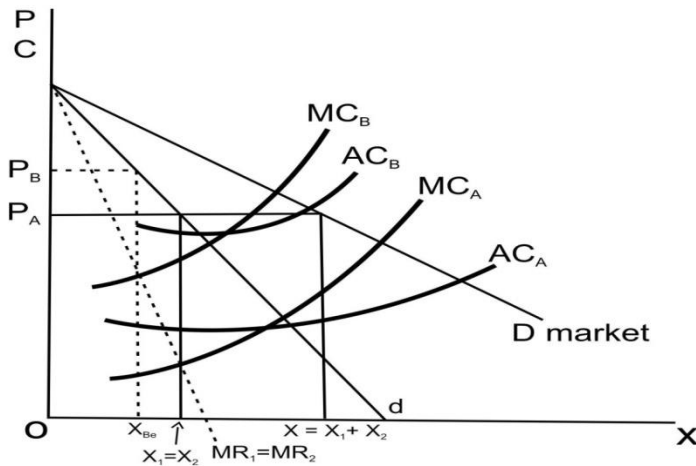
There are different types of price leadership. The most common types of leadership are:

- (a) Pricing is the costing company.
- (b) Price earnings by a large (high) firm.
- (c) Barometric numerical leadership.

These are the types of price leadership that are explored by the traditional belief in leadership as developed by Fellner and others. The characteristic of a traditional price leader is that he sets his price on the sidelines, that is, at a level defined by the intersection of his MC and MR curves. To the leader the code of conduct is $MC = MR$. Some firms are price makers who are not accustomed to maximizing their profits by accepting a leader price. If they do, it will be by accident and not by their decision.

A. The Model of the Low-cost Price Leader:

We will show this model with a live example. It is thought that there are two companies that produce the same product at different costs, which should obviously be sold at the same price. Firms may have equal markets (or may reach an equity market agreement) as in Figure, or they may have unequal markets (or agree to share the market on unequal shares), as in Figure. An important feature of this model is that firms have unequal costs.



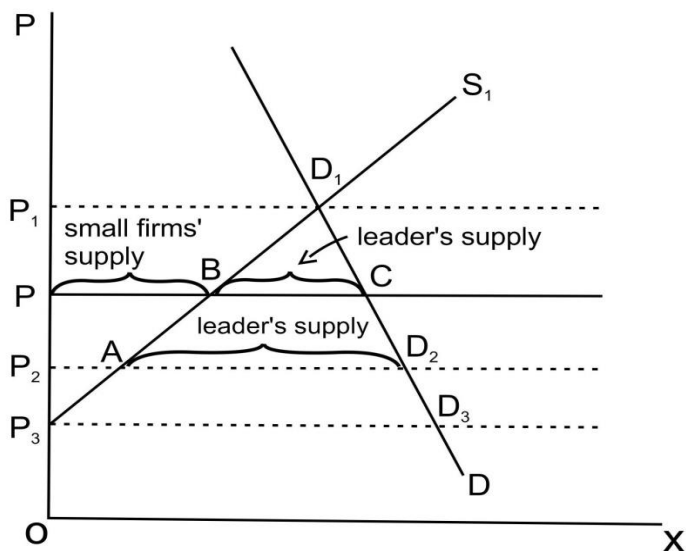
The lowest cost firm will charge the lowest price (P_A) and this price will be followed by the most expensive company, although in this case the B price (follower) does not increase its profits. The follower would earn a high profit by producing low output (X_{Be}) and then selling it at a higher price (P_B). However, it prefers to follow the leader, sacrificing some of its profits to avoid a price war, which it could end if the price dropped enough to exclude its LAC. It should be emphasized that in order for a leader to increase his or her profit rate he or she must be kept at the P_A level and must sell X_A . This means that the follower must provide the value (OXB in figure, or $OX_1 = OX_2$ in figure) that is sufficient to maintain the price set by the leader.

Although the price leadership model emphasizes the fact that the leader sets the price and the follower accepts it, it is clear that firms must also enter into a stock agreement, legally or informally, otherwise the follower can accept the leader price but produce a lower price than the required level of price (set by leader) in the market push (indirectly, with insufficient output) the leader in the non-profit area.

In this way the price follower does absolutely nothing and can be forced to accept the leader's price, but, unless he is bound by a quota distribution agreement (legal or informal) can push the leader to a less prominent position.

B. The model of the Dominant-firm Price Leader:

A barometric firm may not be a low cost or a large firm. It is often the company from the past that has established a reputation for predicting positive economic changes. A factory in another field can also be selected as a barometric leader. For example, a factory in the steel industry can be agreed upon as a (barometric) leader of price changes in the automotive industry. Barometric price leadership can be established for a variety of reasons.

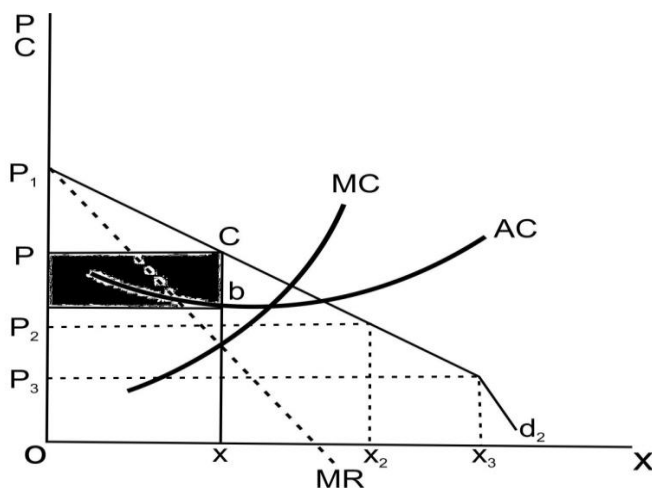


In this model it is assumed that there is a large impressive company with a large market share as a whole, and other small firms, each of which has a small market share. Market demand (DD in Figure) is assumed to be recognized by a leading company.

It is also assumed that the prominent leader is aware of the MCs of small firms, which he can install horizontally and earn the purchase price of small firms for each price; or at best that you have the right amount, from previous experience, of a complete release that may come from this source at various prices. With this information a leader can find his or her turn to seek in the following way.

At each cost a large firm will be able to deliver a total market segment that is not supplied to smaller firms. That is, for each price the demand for the leader product will be the difference between total D (at that price) and the total value of S1. For example, at a P_1 price the demand for a leader product will be zero, because the total required amount (D_1) is given to small firms.

As the price drops below P_1 the demand for the leader product increases. In P_2 the total value is D_2 ; part $P_2 A$ is given to small firms and the remaining AD_2 is provided by a leader. In P_3 the total demand is D_3 and the total price is given by the leader because at that price the small firms do not offer the bulk. Below P_3 market demand is in line with the leader's demand curve.



After finding his demand curve (dL in figure) and given his MC curve, the big company will set the P value when his $MR = MC$ and his output is Ox . In terms of P prices the market value is required by PC, and part PB is supplied by fans of small firms while a maximum of $BC = Ox$ is provided by the leader.

C. Barometric Price Leadership:

A strong leader who strengthens his profits by balancing his MC and his MR, while smaller firms take prices, and may or may not increase their profits, depending on their cost structure. It is assumed that smaller firms will not be able to sell more (per price) than the price stated by S1. However, if a leader wants to increase his profits, he must make sure that small firms will not only follow his price, but also that they will produce the right amount (PB, at P price). Therefore, if we do not have a strong market share agreement, small firms can produce less product than PB and thus force the leader into a non-growth position.

In this model it is officially and informally agreed that all firms will follow (exactly or almost) the price changes of a company that is considered to be well aware of current market conditions and that can predict better future developments in the market. In short, a company chosen as a leader is considered a barometer, indicating economic changes.

First, the rivalry between the largest corporations in the industry can make it difficult to accept one of them as a leader. Second, firms avoid further cost calculations, as economic conditions change. Third, the barometric firm has often proven itself to be a good 'reasonable' predictor of cost and demand changes in a particular industry and economy, and by following other firms can be 'rightly' convinced that they are choosing the right pricing policy.

❖ CHECK YOUR PROGRESS

1. Short Answer Questions:

- Q.1 Give Meaning of Price Determination.
- Q.2 Discuss Pricing in the Long Run.
- Q.3 What is Duopoly?
- Q.4 What Is Monopoly?
- Q.5 What is Perfect Competition?

2. Long Answer Questions:

- Q.1 Discuss Price determination Under Perfect Competition.
- Q.2 Explain Price Leadership in duopoly.
- Q.3 Discuss Price Leadership with examples in detail.
- Q.4 Explain the Model of the Low-cost Price Leader with chart.

3. MCQ Question:

- Q.1 Price determination under perfect competition is not _____
- (a) Market Period
 - (b) Short Run
 - (c) Long Run
 - (d) Medium Run

9.0 INTRODUCTION AND CONCEPT OF REVENUE**9.1 TOTAL REVENUE, AVERAGE REVENUE, MARGINAL REVENUE****9.1.1 TOTAL REVENUE****9.1.2 AVERAGE REVENUE****9.1.3 MARGINAL REVENUE****9.2 RELATIONSHIP BETWEEN AVERAGE REVENUE AND MARGINAL REVENUE IN DIFFERENT MARKET CONDITIONS****9.3 REVENUE CURVES****❖ CHECK YOUR PROGRESS**

9.0 Introduction and Concept of Revenue

- Profit making is referred to as main objective of the firm. Like consumer's main objective is utility maximization, producer's main objective is profit maximization.
- Profit is obtained by the difference between total cost and total revenue, profit can be increased either by reducing cost of production or by increasing revenue.
- Producer's revenue depends upon the demand for good by selling his product or good.
- Thus, producer is interested in knowing what sort of demand curve is faced by him.
- Price paid by the consumer is revenue of the sellers or producers.

Concepts of revenue have been explained as follows.

9.1 Total Revenue, Average Revenue, Marginal Revenue

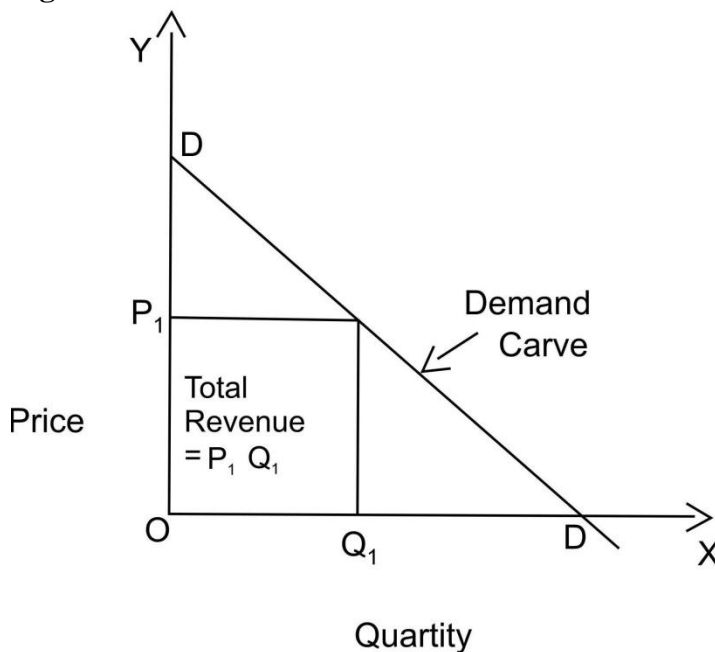
9.1.1 Total Revenue

- Total revenue is the total income or receipts of the seller which is obtained by the selling of the goods and providing services to the consumers.
- According to Dooley, "total revenue is the sum of all sales, receipts or income of a firm."
- According to Stonier and Hague, "total revenue at any output is equal to price per unit multiplied by the quantity sold."
- Revenue, in economics, is calculated by multiplying by the price (p) of the good with quantity produced or sold (q). Symbolically, $R = P \cdot Q$ where, $R = \text{Revenue}$, $P =$

Price, $Q = \text{Quantity}$.

- The sum of revenues from all products and services that firm/company produces is called total revenue. For example, a firm produce n goods. Thus, symbolically, $TR = (P_1 \cdot Q_1) + (P_2 \cdot Q_2) + (\dots \cdot Q_n)$
- For example, if the price of a commodity is Rs. 250 and total units sold are 25, in this case total revenue will be $TR = P \cdot Q = 250 \cdot 25$, $TR = 6,250$.
- The following figure 9.1 shows total revenue curve.

9.1 Figure



- The total revenue earned at a price has been graphically illustrated in above figure. In fig. 9.1 DD shows demand curve for a commodity.
- It can be seen from the figure that at price P_1 the firm can sell Q_1 quantity of output.
- Thus, total revenue earned by selling Q_1 quantity of output is $P_1 \cdot Q_1$, which has been shown in the shaded area of figure.

9.1.2 Average Revenue:

- Average revenue is the revenue obtained by the seller by selling the per unit commodity.
- According to Stonier and Hague, “the average revenue curve shows that the price of the firm’s product is the same at each level of output.
- It is obtained by dividing the total revenue by total output. In simple words, average revenue is revenue earned per unit of output, and it is obtained by the dividing the total revenue by the number of units produced and sold.

- Thus, Average Revenue $= \frac{\text{Total Revenue}}{\text{Total Output Sold}}$ $AR = \frac{T}{Q}$

- For example, total revenue is Rs. 250 is obtained from selling 25 units of product, the average revenue will be equal to $250/25 = \text{Rs. } 10$. Therefore, Rs. 10 is here the revenue earned per unit of output.
- It should be noted that if a seller or producer sells various units of a product at the same price, then average revenue would be the same thing as price. But if seller sells different units of a given product at different prices, then the average revenue would not be equal to the price.
- In practical life it is seen that different units of a product are sold by the seller at the same price in the market. Therefore, average revenue becomes equal to price.
- Hence, in economics, average revenue and price is taken as synonyms except in the case of price discrimination.
- The buyer's demand curve is shown graphically by the quantities demanded or purchased by the buyer at different prices of the good. This happens because the price paid by the consumer/buyer is revenue from seller's/producer's point of view.
- Therefore, average revenue curve of the firm is demand curve of the consumer. Thus, DD as shown in fig 8.1 is also average revenue curve.

9.1.3 Marginal Revenue

- Marginal revenue is the additional revenue earned by selling an additional unit of the product.
- In simple words, marginal revenue is the net addition made to the total revenue by selling one additional unit of a commodity.
- According to Ferguson, „marginal revenue is the change in the total revenue which results from the sale of one more or one less unit of output“.
- As per A. Koutsoyiannis, “marginal revenue is the change in total revenue resulting from selling an additional unit of commodity”.
- Algebraically, marginal revenue is the net addition to total revenue by selling „n“ units of commodity instead of n-1. Where n is any given number.

- Thus, mathematically and statistically, $MR = \frac{\Delta TR}{\Delta Q}$ or $\frac{dr}{dq}$ where MR = Marginal revenue,

$\Delta TR =$ change in total revenue, $\Delta Q =$ change in quantity.

- $MR_n = TR_n - TR_{n-1}$, $TR_n =$ total revenue of „n“ units, $TR_{n-1} =$ total revenue from n-1 units.
 $MR_n =$ marginal revenue of „n“th unit, n = any given number

- For example, if a seller/ producer sells his 20 units of quantity at price Rs.10 per unit, he will obtain Rs. 200 as the total revenue. If producer/seller now increases his sales of product by one unit and sells 23 units, assuming that price falls to Rs. 9 per unit. He will obtain total revenue of Rs.207 from the sale of 21 units of the good. It implies that 23rd unit of output has added Rs. 7 to the total revenue. Thus, Rs 7 is the marginal revenue.

- By putting in formula, in above example, change in total revenue (ΔTR) is = 7 and change in quantity (ΔQ) is = 1, thus, $MR = \frac{\Delta TR}{\Delta Q} = MR = 7/1 = 7$.
- $\frac{\Delta TR}{\Delta Q}$ represents the slope of total revenue curve. Therefore, if we have the total revenue curve then we can find out marginal revenue at different levels of output by measuring the slope at corresponding points on the total revenue curve.

9.2 Relationship between Average Revenue and Marginal Revenue in different market conditions.

- First, we will see **relationship among total, average and marginal revenue under imperfect competition**, i.e., monopoly, monopolistic competition and oligopoly.
- Monopoly is that type of market where there is single producer or seller of a particular product which has no close substitutes. Thus, in simple words monopoly means a single seller. Hence, the monopolist does not have any rival or competitors. No firm can enter in monopoly market.
- Monopolistic competition is that type of market in which large number of firms produce and sell products that are differentiated but are close substitute of each other. In this type of market, there is mixed elements of monopoly and competition. In monopolistic competitively market, large number of firms exercise sole control over the supply of its brand of the product, but along this firm also faces competition from the other brands or varieties of the product which are close substitute of its brand.
- Oligopoly market is that type of market in which there are few firms supplying the product. In a pure oligopoly market, a few firms produce and sell homogeneous/identical products. For example, steel, cement and fertilizers industries in India. In India, there are not only few firms in them but their products are also almost homogeneous. In differentiated oligopoly market, a few firms produce product which are differentiated but close substitutes of each other.
- The following table 9.1 represents average revenue and marginal revenue in imperfect competitive market.

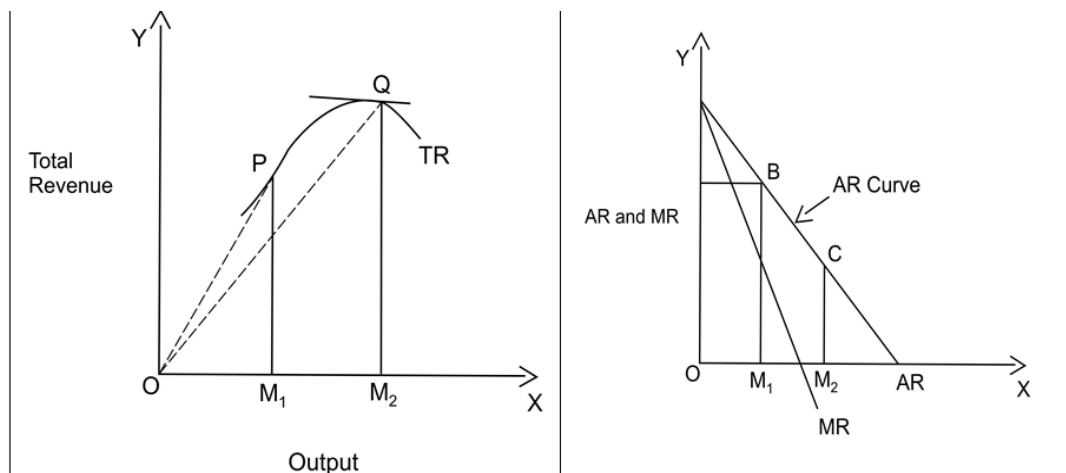
No. of units sold	Total Revenue	Average Revenue or Price	Marginal Revenue
1	21	21	21
2	40	20	19
3	57	19	17
4	72	18	15
5	85	17	13
6	96	16	11
7	105	15	9
8	112	14	7
9	112	12.44	0
10	100	10	-12

REVENUE ANALYSIS

- It is clear from the table as more units of commodity are sold, price of the commodity decreases. It is due to if monopoly, monopolistic competition or oligopoly market prevailsthen more output or more units of commodity are produced and sold by firms, its price decreases.
- Marginal revenue is obtained by taking out the difference between the two successive total revenues. Thus, when one unit is sold, total revenue is 21. When two units are sold, AR or P decreases to Rs. 20 and TR increases to Rs. 40. Marginal revenue is therefore is equal to $(40 - 21 = 19)$. Similarly, marginal revenue of further units is obtained. Marginal revenue is negative when total revenue decreases. Hence, in above table quantity sold is increased from 9 units to 10 units, the total revenue decreases from Rs 112 to Rs. 100, thus, the marginal revenue becomes negative and is equal to -12.
- This relationship is also illustrated in the following figure 9.2

Figure 9.2

Figure 9.2 Total, Average and Marginal Revenue under Imperfect Competition



- In all forms of imperfect competitive market such as monopoly, monopolistic competitive and oligopoly market, individual firm faces downward slopping average revenue curve because of when firm increases its level of output or production, the price of product decreases. This has been illustrated in above figure.
- It is seen figure panel (a) total revenue is increasing but a decreasing rate. It implies marginal revenue which is equal to the slope of total revenue curve. Point P on the total revenue curve (TR), corresponding to output

OM1 measures the slope of this tangent represent marginal revenue which is equal to PM1 at output OM1 which has been shown in panel (b) of this figure. At output level OM2 has been drawn tangent to the point Q on the total revenue curve. The slope of this tangent is zero and thus in panel (b) corresponding to output OM2, marginal revenue is zero.

- Average revenue at various levels of output has been obtained by drawing rays from the origin to the corresponding points on the TR curve. Therefore, the rays OP and OQ has been drawn from the origin to the TR curve at outputs OM1 and OM2. The slopes of these rays OP and OQ shows average revenue M1B at output M1 and M2C at output level OM2 in panel (b) of figure 9.2.
- In panel (b) of the figure 9.2, it is observed that AR curve is decreasing downward and marginal revenue (MR) lies below it.
- The fact that MR curve below AR curve refers that marginal revenue decreases more rapidly than average revenue. When OM2 units of the good are sold, MR is zero, and quantity sold is increased beyond OM2 marginal revenue is negative.

❖ **Relationship between total, marginal and average revenue under perfect competition:**

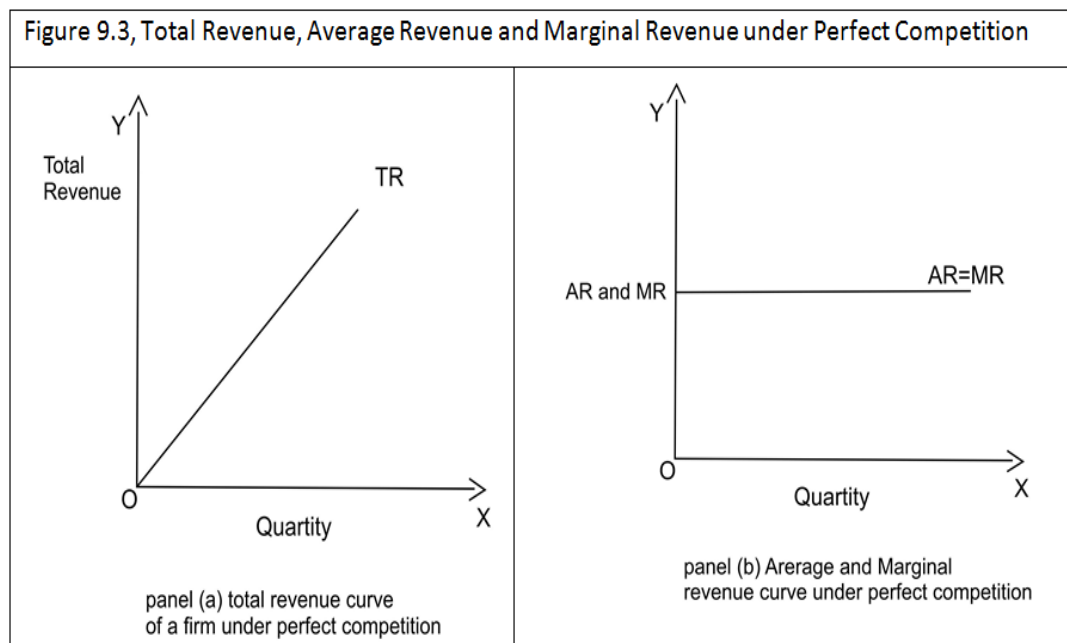
- In perfectly competitive market, individual firm faces perfectly elastic demand curve and price remain beyond the control of a firm, average revenue remains constant.
- Thus, if the price or average revenue remains the equal when more units of a quantity are sold, the marginal revenue will be equal to average revenue. It happens because if one more unit is sold and price does not decrease, the addition made to the total revenue by that unit will be equal to the price at which it is sold no loss in revenue is incurred on the previous units in this case.
- This has been illustrated in the following table.

Table 9.2 Total, Average and Marginal Revenue under perfect competition			
No. of units sold	Price or AR	Total Revenue (Price* Output)	Marginal Revenue
1	10	10	10
2	10	20	10
3	10	30	10
4	10	40	10
5	10	50	10

REVENUE ANALYSIS

- In above table price remains constant at the level of Rs. 10 when more units of the product are sold. Total revenue has been obtained by the multiplying the quantity sold by the price.
- When two units of the goods are sold instead of one, total revenue increases from Rs. 10 to Rs. 20, the addition made to the total revenue shows marginal revenue. Thus, marginal revenue will be equal to the $20-10= 10$. Similarly, when three units at the product are sold, the total revenue increases from Rs 20 to Rs. 30, the marginal revenue will be equal to Rs. 10. Similarly, it is found for further units of the product sold that marginal revenue is equal to price.
- Under perfectly competitive market, average revenue remains constant and marginal revenue is equal to average revenue. This has been shown in the following figure 9.3.

Figure 9.3

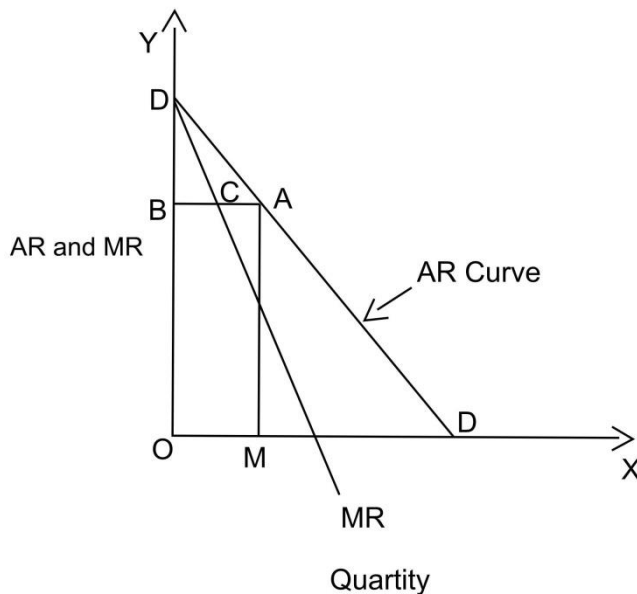


- In above figure under panel (a) total revenue (TR) curve is a straight line from the origin. It implies that slope of this TR curve remains constant and therefore MR of the firm remains constant.
- This straight-line TR curve begins from the origin, average revenue which indicates price too, remains constant and marginal revenue will be equal to it. It is because under perfectly competitive market price of the product is given and remain constant.
- Average revenue and marginal revenue curve under perfectly competitive market have been shown in panel (b) of figure 9.3.
- In this type of market, average revenue curve is a horizontal straight line i.e., parallel to OX axis. This line implies that price or average revenue remains the same when quantity sold is increased. Marginal revenue curve is equal to average revenue curve.

9.3 Revenue Curves:

Geometry of AR and MR curves under imperfect competition:

- It has been observed that in monopoly and in the various forms of imperfect competition AR curve slopes downward and MR curve lies below it.
- It is important to remember that the position of MR curve corresponding to the downwardsloping straight line AR curve.
- When a straight-line average revenue curve slopes downward, marginal revenue curve MR which lies below it will pass through the middle of the distance between AR curve and the OY axis as shown in following figure 9.4.

figure 9.4.


- In above figure, AR and MR curves are downward sloping and straight-lines. It can be seen that line AB is drawn to the OY axis and point A is taken on the average revenue curve. MR curve cuts the perpendicular AB at point C.
- MR curve cuts half-way the distance between AR curve and the OY axis, then AC must be equal to BC. From this, we can see the way of drawing MR curve corresponding to a given AR straight line curve.

Non-Linear AR and MR Curves:

Figure 9.5.

Figure 9.5 Position of MR Curve when AR Curve is convex to the origin

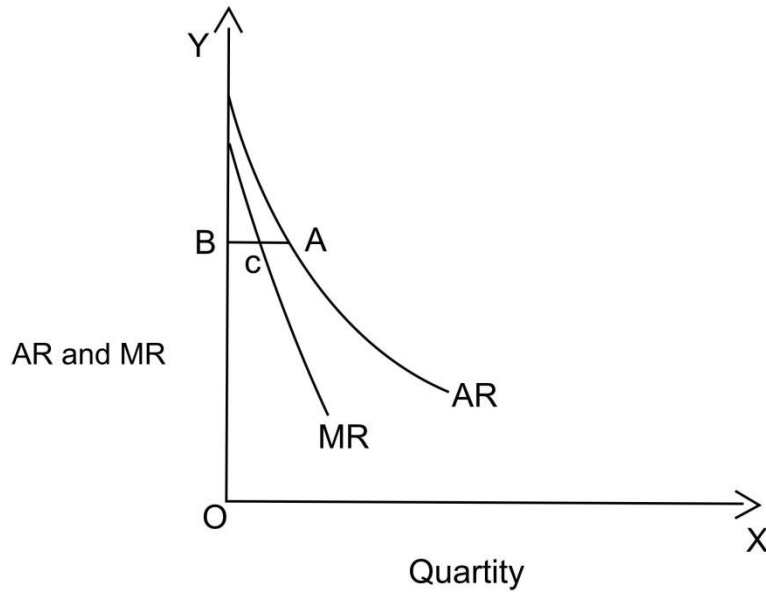
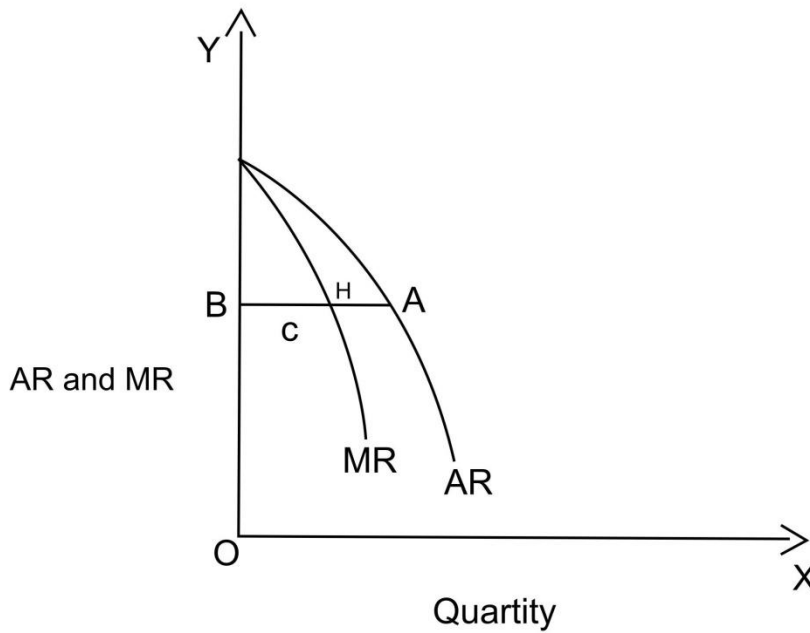


Figure 9.6.



- Marginal revenue curve corresponding to a convex or concave average revenue curve is not of straight-line shape but it is either convex or concave to the origin.
- Now, we will see the relationship of MR curve and AR curve is either convex or concave.
- In these cases, the marginal revenue curve will not lie between the average revenue curve and OY axis.

- If the average revenue curve is convex to the origin as shown in figure 9.5 the marginal revenue curve MR will also be convex to the origin and will cut any perpendicular drawn from AR curve to the OY axis more than halfway as measured from the average revenue curve.
- In figure 9.6, if the average revenue curve is concave to the origin, the marginal revenue curve will also be concave and will cut vertical line from the average revenue curve to the OY axis less than half-way as measured from the average revenue curve.
- In figure 9.5 and 9.6 C is the middle point on the perpendicular line AB.

❖ **Numerical Example**

1. Suppose $Q = 40 - 2P$, where Q is output and p is price. Find marginal revenue function. At what output total revenue is maximum.

Answer: To get MR we have first to find total revenue function. Price is expressed as a function of output demand ($P = a - bQ$)

From the given function, $Q = 40 - 2P$, we get

$2P = 40 - Q$, $P = 20 - 0.5Q$, which is inverse demand function. $TR = P * Q$

Thus, $TR = 20Q - 0.5Q^2$

Marginal revenue is the first derivative of total revenue function.

$MR = dTR/dQ = 20 - Q$

Total revenue is maximum at the output level where $MR = 0$. Thus, setting $MR = 0$, we have $20 - Q = 0$, $Q = 20$. Thus, total revenue is maximum at output level $Q = 20$.

❖ **CHECK YOUR PROGRESS**

- 1) **Explain the following concepts of revenue.**
 - a. Total revenue
 - b. Marginal revenue
 - c. Average revenue
- 2) Discuss relationship among total revenue, marginal revenue and average revenue under perfectly competitive market.
- 3) Discuss relationship among total revenue, marginal revenue and average revenue under imperfect competition.
- 4) Discuss in detail revenue curves.

REVENUE ANALYSIS

5) Multiple Choice Questions

1. is the total income or receipts of the seller which is obtained by the selling of the goods and providing services to the consumers.

- a. Total revenue
- b. Marginal revenue
- c. Average revenue
- d. None of these

2. The formula of total revenue is $R = \underline{\quad}$.

- a. $Q * P$
- b. $P * Q$
- c. $P = Q$
- d. $Q = P$

3. is the revenue obtained by the seller by selling the per unit commodity.

- a. Total revenue
- b. Marginal revenue
- c. Average revenue
- d. None of these

4. $AR = \underline{\quad}$

- a. TR/Q
- b. MR/Q
- c. $P * Q$
- d. P/Q

5. is the additional revenue earned by selling an additional unit of the product.

- a. Total revenue
- b. Marginal revenue
- c. Average revenue
- d. None of these

6. In perfectly competitive market .

- a. $AR = MR$
- b. $AR > MR$
- c. $AR < MR$
- d. $AR * MR$

MCQ Answer

1	2	3	4	5	6
a	b	c	a	b	a

10.0 INTRODUCTION**10.1 MANAGERIAL ECONOMICS AND ECONOMICS.****10.2 MICRO- ECONOMICS****10.3 MACRO ECONOMICS****10.4 MANAGERIAL ECONOMICS AND ACCOUNTING****10.5 MANAGERIAL ECONOMICS AND MATHEMATICS****10.6 MANAGERIAL ECONOMICS AND OPERATIONS RESEARCH****10.7 MANAGERIAL ECONOMICS AND THEORY OF DECISION MAKING****10.8 MANAGERIAL ECONOMICS AND STATISTICS****❖ CHECK YOUR PROGRESS**

10.0 INTRODUCTION

Management economics has close links with other sectors and learning sectors. (The theme has benefited from working with Economics, Mathematics and Statistics and applied the concepts of Management and Accounting.) Reframe this sentence to make it meaningful Management economics incorporates concepts and approaches from these studies and brings them to management problems.

10.1 MANAGERIAL ECONOMICS AND ECONOMICS

Management or Managerial Economics is used economically in decision-making. A special economic sector, it closes the gap between pure economic theory and management-rial practice. There are two main branches of Economics - micro-economics and macro-economics.

10.2 MICRO- ECONOMICS

'Micro' means (little) mini/small/miniature. It learns about the behaviour of individual units and subgroups of units. Research of specific firms, specific households, individual prices, wages, income, individual industries and certain assets. So micro-economics offers a limited view of the economy.

The economic roots of management come from a small economic thought. In terms of pricing, demand concepts, demand tightness, low-cost revenues, short-term approaches and market structure ideas are the sources of micro-economics used in management economics. It uses well-known models in the concept of pricing such as the independent price model, the kinked demand theory and the price discrimination model.

10.3 MACRO ECONOMICS

‘Macro’ means (a lot) big/large/large-scale. It deals with the behaviour of major aggregates in the economy. Large collections are total savings, total expenditure, total income, total employment, average price, wage rate, cost structure, etc.

It examines the interactions between different compounds, and the causes of their variability. Problems with total revenue determination, total employment and average price levels are central to macro-economic problems.

Macro economies are also related to economic management. The situation in which the business operates, the decline in national income, changes in financial and monetary values and variations in the level of business activity are in line with business decisions. An understanding of the full functioning of the economic system is very helpful to the administrative economy in shaping its politics.

Macro-economic plays a very vital role in business forecasting. The most widely used model in today’s forecast is the complete national product model.

10.4 MANAGERIAL ECONOMICS AND ACCOUNTING

Management economics is closely related to accounting. The financial performance of a business company is recorded. A business is started with the sole purpose of making a profit. Capital is invested / used to buy buildings such as construction, furniture, etc. and to meet current business costs.

Goods are bought and sold for cash and credit. Fees are payable to credit providers. Available to credit buyers. Expenses are met in cash. This continues with the day-to-day running of the business. The purchase of goods, the sale of goods, the payment of money, the receipt of money and the like is called a business transaction.

Business transactions are varied and varied. This has created the need to record business transactions in books. They are written in tithing in a systematic way so that it is easy to study the results.

There are three classes of accounts:

- (i) Personal account,
- (ii) Property accounts, and
- (iii) Nominal accounts.

Management Accounting provides accounting data for business decision-making. Financial technology strategies are critical to a company's success because profit growth is the company's main goal.

10.5 MANAGERIAL ECONOMICS AND MATHEMATICS

Mathematics is another important subject that is closely related to the management

economics. For the discovery and disclosure of economic analysis, we need a set of mathematical tools. Statistics have helped to develop economic perceptions and now the mathematical economy has become a very important sector of the economy.

The mathematical approach to economic thinking makes them more accurate and logical. By predicting and predicting economic factors for decision-making and planning, the mathematical approach is very helpful. The most important branches of mathematics commonly used by management economists are geometry, algebra and calculus.

The mathematical concepts used by economic managers are logarithms and exponential, vectors and determinants, input tables. The closest job research to the management economy is statistically significant.

10.6 MANAGERIAL ECONOMICS AND OPERATIONS RESEARCH

Mathematicians, , engineers and others join together and develop models and analytical tools that have grown into a special topic known as operation research. The primary purpose of this approach is to develop a systematic scientific model that can be used to make policy.

Development of strategies and concepts such as Linear Programming, Dynamic Programming, Input-output Analysis, Inventory Theory, Information Theory, Probability Theory, Query Theory, Game Theory, Decision Theory and Symbolic Logic.

10.7 MANAGERIAL ECONOMICS AND THEORY OF DECISION MAKING

The decision-making concept is a new study that has implications for administrative economics. In a management process such as planning, planning, leadership and control, decision-making is always important. Decision making is an important part of today's business management. A manager faces many issues related to his or her business such as production, innovation, cost, marketing, pricing, investment and staff.

An economist is interested in the efficient use of scarce resources which is why they are naturally interested in the problems of business decisions and use the economy to manage business problems. Management economics is therefore used economically indecision-making.'

10.8 MANAGERIAL ECONOMICS AND STATISTICS

Statistics is important for economic management. It provides the basis for a theory. It provides each a company with the necessary steps for the appropriate relationships involved in decision-making. Mathematics is a very useful science in business management because a business runs with balance and opportunity.

Statistics provides many tools for economic management. Suppose that a prediction must be made. For this purpose, a demonstration of the trend. Similarly, many regression processes are used. In administrative economics, intermediate trend measures such as definition, mode, mode, and distribution measures,

adjustment, regression, small square, characters are widely used.

Mathematical tools are widely used to solve management problems. For example, sampling is very helpful in data collection. Management economics uses multiple consolidation and regression in business problems that involve some form of cause-and-effect relationships.

❖ **CHECK YOUR PROGRESS**

1. Give Answers for the following.

- Q.1 Discuss Relationship between Managerial Economics with Operation Research.
- Q.2 Do you think there is relationship between economics and accounting? How? Discuss it in detail.
- Q.3 Explain how Economics can be helpful in decision making. Where? In which field/s?
- Q.4 Discuss relationship of economics with other important areas of business.

યુનિવર્સિટી ગીત

સ્વાધ્યાય: પરમં તપ:

સ્વાધ્યાય: પરમં તપ:

સ્વાધ્યાય: પરમં તપ:

શિક્ષણ, સંસ્કૃતિ, સદ્ભાવ, દિવ્યબોધનું ધામ
ડૉ. બાબાસાહેબ આંબેડકર ઓપન યુનિવર્સિટી નામ;
સૌને સૌની પાંખ મળે, ને સૌને સૌનું આભ,
દશે દિશામાં સ્મિત વહે હો દશે દિશે શુભ-લાભ.

અભણ રહી અજ્ઞાનના શાને, અંધકારને પીવો ?
કહે બુદ્ધ આંબેડકર કહે, તું થા તારો દીવો;
શારદીય અજવાળા પહોંચ્યાં ગુર્જર ગામે ગામ
ધ્રુવ તારકની જેમ ઝળહળે એકલવ્યની શાન.

સરસ્વતીના મયૂર તમારે ફળિયે આવી ગહેકે
અંધકારને હડસેલીને ઉજાસના ફૂલ મહેકે;
બંધન નહીં કો સ્થાન સમયના જવું ન ઘરથી દૂર
ઘર આવી મા હરે શારદા દૈન્ય તિમિરના પૂર.

સંસ્કારોની સુગંધ મહેકે, મન મંદિરને ધામે
સુખની ટપાલ પહોંચે સૌને પોતાને સરનામે;
સમાજ કેરે દરિયે હાંકી શિક્ષણ કેરું વહાણ,
આવો કરીયે આપણ સૌ
ભવ્ય રાષ્ટ્ર નિર્માણ...
દિવ્ય રાષ્ટ્ર નિર્માણ...
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