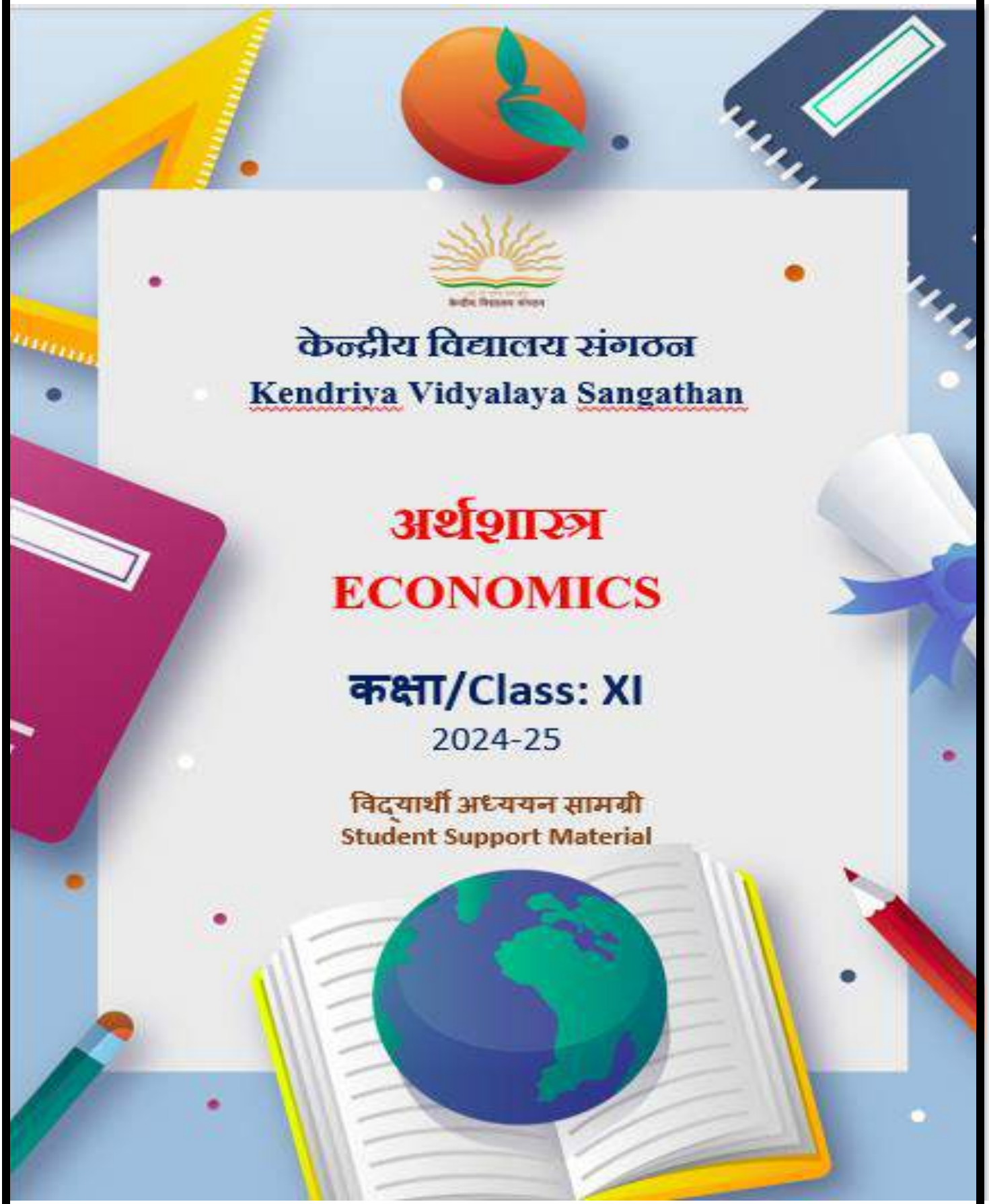
केन्द्रीय विद्यालय संगठन
Kendriya Vidyalaya Sangathan
अर्थशास्त्र
ECONOMICS
कक्षा/Class: XI
2024-25
विद्यार्थी अध्ययन सामग्री
Student Support Material

संदेश

विद्यालयी शिक्षा में शैक्षिक उत्कृष्टता प्राप्त करना केन्द्रीय विद्यालय संगठन की सर्वोच्च वरीयता है। हमारे विद्यार्थी, शिक्षक एवं शैक्षिक नेतृत्व कर्ता निरंतर उन्नति हेतु प्रयासरत रहते हैं। राष्ट्रीय शिक्षा नीति 2020 के संदर्भ में योग्यता आधारित अधिगम एवं मूल्यांकन संबन्धित उद्देश्यों को प्राप्त करना तथा सीबीएसई के दिशा निर्देशों का पालन, वर्तमान में इस प्रयास को और भी चुनौतीपूर्ण बनाता है।

केन्द्रीय विद्यालय संगठन के पांचों **आंचलिक शिक्षा एवं प्रशिक्षण संस्थान** द्वारा संकलित यह 'विद्यार्थी सहायक सामग्री' इसी दिशा में एक आवश्यक कदम है । यह सहायक सामग्री कक्षा 9 से 12 के विद्यार्थियों के लिए सभी महत्वपूर्ण विषयों पर तैयार की गयी है । केन्द्रीय विद्यालय संगठन की 'विद्यार्थी सहायक सामग्री' अपनी गुणवत्ता एवं परीक्षा संबंधी सामग्री-संकलन की विशेषज्ञता के लिए जानी जाती है और अन्य शिक्षण संस्थान भी इसका उपयोग परीक्षा संबंधी पठन सामग्री की तरह करते रहे हैं । शुभ-आशा एवं विश्वास है कि यह सहायक सामग्री विद्यार्थियों की सहयोगी बनकर सतत मार्गदर्शन करते हुए उन्हें सफलता के लक्ष्य तक पहुंचाएगी

शुभाकांक्षा सहित ।

निधि पांडे
आयुक्त, केन्द्रीय विद्यालय संगठन

KVS ZIET MYSORE

EDITORIAL TEAM

COORDINATORS

Mr. N HARI PRASAD PRINCIPALKV NFC NAGAR, GHATKESAR,HYDERABAD	**MRS. RUMMA RAINA** TA-ECONOMICS, ZIET MYSORE

SUBJECT EXPERTS(PGT-ECONOMICS)

Mrs. K. BEENA KV JALAHALLI No.2, BANGALORE	**Mr. PAWAN KUMAR** KV No. 1 HUBBALLI, BANGALORE
Mrs. SUSHMA KUMAR KV AFS, YELAHANKA, BANGALORE	**Mr. ANIL KUMAR** KV NAL, BANGALORE
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CBSE SYLLABUS 2024-25

ECONOMICS (030)
CLASS – XI (2024-25)

Theory: 80 Marks **3 Hours**
Project: 20 Marks

Units		Marks	Periods
Part A	**Statistics for Economics**		
	Introduction	15	10
	Collection, Organisation and Presentation of Data		30
	Statistical Tools and Interpretation	25	50
		40	
Part B	**Introductory Microeconomics**		
	Introduction	04	10
	Consumer's Equilibrium and Demand	14	40
	Producer Behaviour and Supply	14	35
	Forms of Market and Price Determination under perfect competition with simple applications	08	25
		40	
			200
Part C	**Project Work**	**20**	**20**

Part A: Statistics for Economics

In this course, the learners are expected to acquire skills in collection, organisation and presentation of quantitative and qualitative information pertaining to various simple economic aspects systematically. It also intends to provide some basic statistical tools to analyse, and interpret any economic information and draw appropriate inferences. In this process, the learners are also expected to understand the behaviour of various economic data.

Unit 1: Introduction **10 Periods**

What is Economics?

Meaning, scope, functions and importance of statistics in Economics

Unit 2: Collection, Organisation and Presentation of data **30 Periods**

Collection of data - sources of data - primary and secondary; how basic data is collected with concepts of Sampling; methods of collecting data; some important sources of secondary data: Census of India and National Sample Survey Organisation.

Organisation of Data: Meaning and types of variables; Frequency Distribution.

Presentation of Data: Tabular Presentation and Diagrammatic Presentation of Data: (i) Geometric forms (bar diagrams and pie diagrams), (ii) Frequency diagrams (histogram, polygon and Ogive) and (iii) Arithmetic line graphs (time series graph).

Unit 3: Statistical Tools and Interpretation **50 Periods**

For all the numerical problems and solutions, the appropriate economic interpretation may be attempted. This means, the students need to solve the problems and provide interpretation for the results derived.

Measures of Central Tendency- Arithmetic mean, Median and Mode

Correlation – meaning and properties, scatter diagram; measures of correlation - Karl Pearson's method (two variables ungrouped data) Spearman's rank correlation (Non-Repeated Ranks and Repeated Ranks).

Introduction to Index Numbers - meaning, types - Wholesale Price Index, Consumer Price Index and index of industrial production, uses of index numbers; Inflation and Index Numbers, Simple Aggregative Method.

Part B: Introductory Microeconomics

Unit 4: Introduction **10 Periods**

Meaning of microeconomics and macroeconomics; positive and normative economics

What is an economy? Central problems of an economy: what, how and for whom to produce; concepts of Production Possibility Frontier and Opportunity Cost.

Unit 5: Consumer's Equilibrium and Demand **40 Periods**

Consumer's equilibrium - meaning of Utility, Marginal Utility, Law of Diminishing Marginal Utility, conditions of consumer's equilibrium using marginal utility analysis.

Indifference curve analysis of consumer's equilibrium-the consumer's budget (budget set and budget line), preferences of the consumer (indifference curve, indifference map) and conditions of consumer's equilibrium.

Demand, market demand, determinants of demand, demand schedule, demand curve and its slope, movement along and shifts in the demand curve; price elasticity of demand - factors affecting price elasticity of demand; measurement of price elasticity of demand – percentage-change method and total expenditure method.

Unit 6: Producer Behaviour and Supply **35 Periods**

Meaning of Production Function – Short-Run and Long-Run

Total Product, Average Product and Marginal Product.

Returns to a Factor

Cost – Short run costs - Total Cost, Total Fixed Cost, Total Variable Cost; Average Cost; Average Fixed Cost, Average Variable Cost and Marginal Cost - meaning and their relationships.

Revenue – Total Revenue, Average Revenue and Marginal Revenue - meaning and their relationship.

Producer's Equilibrium - meaning and its conditions in terms of Marginal Revenue-Marginal Cost.

Supply, market supply, determinants of supply, supply schedule, supply curve and its slope, movements along and shifts in supply curve, price elasticity of supply; measurement of price elasticity of supply - percentage-change method.

Unit 7: Perfect Competition - Price Determination and simple applications.

25 Periods

Perfect competition - Features; Determination of market equilibrium and effects of shifts in demand and supply. (Short Run Only)

Simple Applications of Demand and Supply: Price ceiling, Price floor.

Part C: Project in Economics **20 Periods**

Guidelines as given in Class XII curriculum

BLUE-PRINT OF QUESTION PAPER

CLASS XI **Max Marks:80**

ECONOMICS **Time: 3hr**

UNIT	MCQ (1M)	SA I (3M)	SA II (4M)	LA(6M)	Marks
SECTION A Introduction to Statistics	1(3)	-	4(1)	-	7
Collection, organization, and presentation of data	1(4)	-	4(1)	-	8
Statistical tools and interpretation	1(3)	3(1),3(1) *	4(1) *	6(1), 6 (1) *	25
SECTION B Introductory microeconomics	-	-	4(1) *	-	4
Consumer Equilibrium and Demand	1(4)	-	4(1)	6(1)	14
Producer behavior and supply	1(5)	3(1) *	-	6(1) *	14
Forms of Market	1(1)	3(1)	4(1)	-	8
Total	1(20) =20	3(4) = 12	4(6) =24	6(4) = 24	80(34)

*** Marked questions are Alternate/Choice questions.**

QUESTION PAPER DESIGN

Suggested Question Paper Design
Economics (Code No. 030)
Class XI (2024-25)
March 2025 Examination

Marks: 80 **Duration: 3 hrs.**

SN	Typology of Questions	Marks	Percentage
1	**Remembering and Understanding:** Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	44	55%
2	**Applying**: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	18	22.5%
3	**Analysing, Evaluating and Creating:** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	18	22.5%
	Total	**80**	**100%**

PART-A: STATISTICS FOR ECONOMICS

UNIT-1 INTRODUCTION

GIST OF THE TOPIC

Basic Terms

1. **Economics-** It is the study of making rational choices in the presence of scarcity.It studies how people and society use scarce resources having alternative uses to produce various goods and services to meet their wants.
2. **Scarcity-**A situation when supply of resources is less than its available demand. It is the root cause of all economic problems.
3. **Economic problem-**The problem of making choices which arises due to unlimited wants , scarcirt of resources and alternative useds of resources.
4. **Economic activities-** They are those activities which are undertaken to earn income. It is related to the use of scarce resources to satisfy maximum human wants.These are: production, consumption and distribution.
5. **Non-economic activities:** Activities which are not related to earning income.

Meaning of Statistics
In singular sense, statistics refers to statistical methods. These are:

- Collection of data
- Organization of data
- Presentation of data
- Analysis of data
- Interpretation of data

In a Plural sense,statistics means aggregates of facts (Data) greatly affected by multiplicity of causes, numerically expressd, collected systematicaly for a pre determined purpose.

Characteristics of Statistics in Plural Sense:

- Statistics are an aggregate of facts.
- Statistics are greatly affected by multiplicity of causes.
- Statistics are numerically expressed.
- Statistics are enumerated or estimated according to a reasonable standard of accuracy.
- Statistics are collected systematically.
- Statistics are collected for a pre-determined purpose.
- Statistics should be placed in relation to each other i.e. they can be used for comparisons

Functions of Statistics

- Helps in understanding economic problems by using various statistical methods like mean,median,graphs etc.
- Helps in the presenting facts in definite form For example,a statement like population is growing at a rate of 1.5% annually is more convincing than simply stating that population is increasing.
- Statistics helps in condensing mass data into a few numerical measures.

- Establishes relation between factors.
- Helps in the formulation of plans and policies for solving economic problem of businessmen as well as government.
- Helps in inter-sectoral and inter-temporal comparisons i.e. comparison across different sectors and also across different time periods.

Importance of Statistics

- Statistics is useful in Economics (consumption, production, and distribution)
  Consumption data is helpful in planning the consumer's budget.
  The data regarding production activity is particularly helpful in making adjustments in demand and supply and deciding quantity of production
  Statistical methods are used to solve the problem of distribution of income among various factors of production in an economy.
- Statistics is useful in economic planning
  Economic planning involves growth targets.Use of statistical methods help in evaluating the various stages of economic planning.
- Statistics is useful in business
  Businessmen use market research based on statistics to estimate market demand for their product.Details of transaction also is done using statistical tools
- Statistics is useful in administration and governance
  Government often uses data related to poverty,unemployment,per capita income etc. to start implement various public welfare programmes and schemes.

Scope of Statistics

Scope of Statistics can be classified as:

1. Statistical methods	**2. Applied statistics**
• Collection of data • Organization of data • Presentation of data • Analysis of data • Interpretation of data	• Descriptive • Scientific

Quantitative and Qualitative data

Quantitative data are data represented numerically, including anything that can be counted, measured, or given a numerical value. Examples of quantitative data can be Revenue in dollars, Weight in kilograms, Age in months or years etc.

Qualitative data is a type of data that describes characteristics or qualities, and is often non-numerical. It can be collected through interviews, surveys, observations, focus groups, and other methods.

MULTIPLE CHOICE QUESTIONS (1 MARK)

1 Which of the following statements can be considered as Statistics?

a) Marks code by Saumya was 14% higher than Manish	**b)** The profit of company a is rupees 25 crores
c) The life expectancy in India is 72 years	**d)** The manufacturing cost of a refrigerator is 35000

2 Identify the statement that is not false.

a) Statistics may or may not be numerically expressed	**b)** Statistics are true only on an average
c) Statistical tools used for presentation of data	**d)** Statistics studies individual units

3 Which out of the following is not an example of quantitative data?

a) Height	**b)** Weight
c) Marks	**d) C**reativity

4 Shailja submitted a school project on the growth of the telecommunication industry in India. She follows the steps listed below. Arrange the steps in logical order:

i. Using average and correlation coefficients to analyze numerical information
ii. Collection of data about market share and revenue of various telecom service providers
iii. Organization of data in proper sequence
iv. Presentation of data in the form of tables diagrams and graph
v. Interpretation of data by determining the degree of relationship between various economic variables expressed

a) i , iii, v, ii, iv	**b) i , iv, v, ii, iii**
c) ii , iii, iv, v, i	**d) iii, iv, v, i, iii**

5 Identify the economic agent who uses goods and services for the satisfaction of human wants:

a) Producer	**b)** Seller
c) Consumer	**d)** Investor

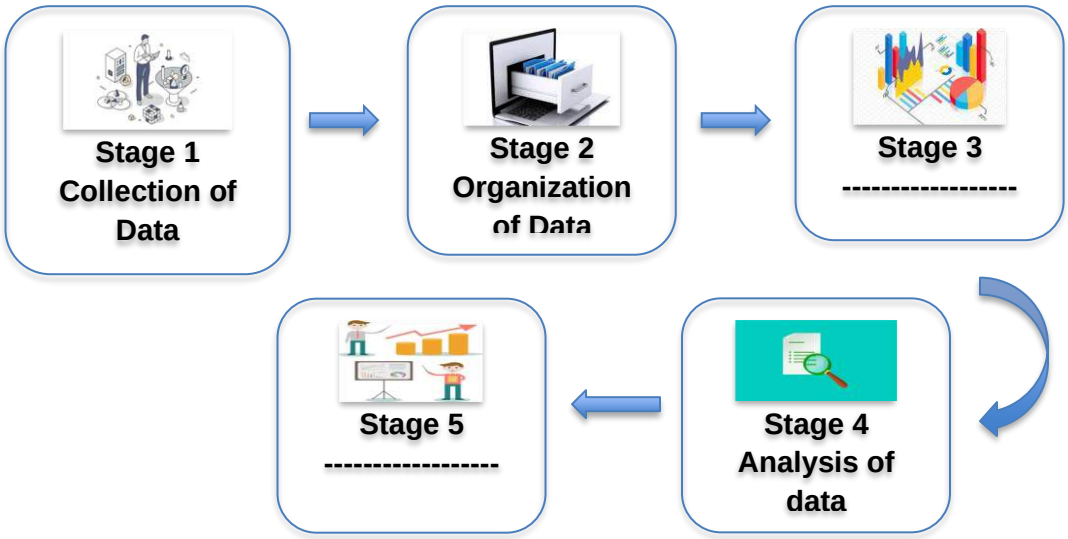
ASSERTION -REASON TYPE QUESTIONS-

6 **Read the following statements carefully -Assertion (A) and Reason (R) and choose the correct alternative:**
Assertion (A)-Statistical results at true only on an average.
Reason (R) – Like laws of natural sciences statistical results are exactly valid in all situations.

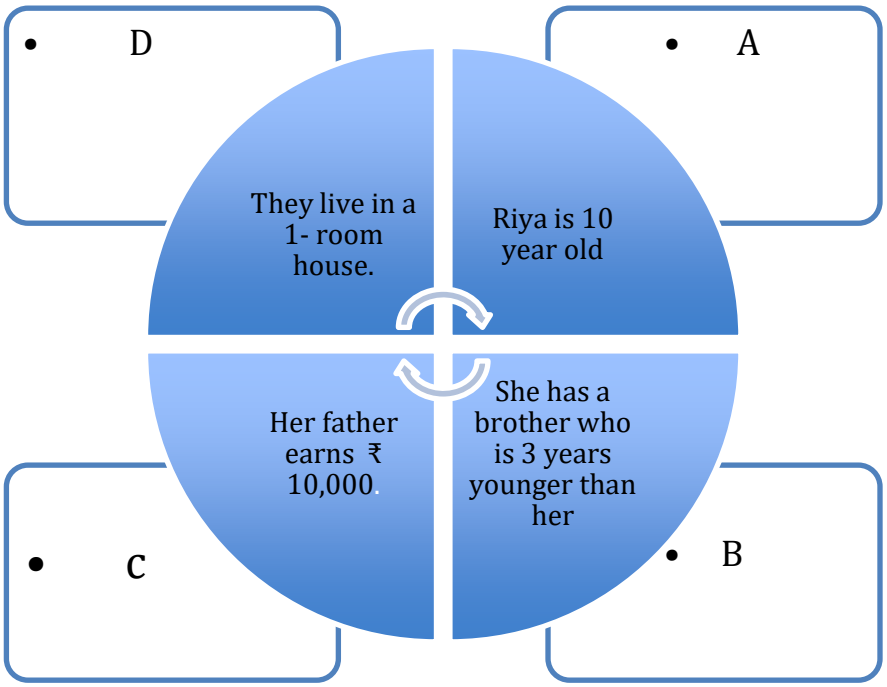
	a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of (A) **b)** Assertion (A) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). **c)** Assertion (A) is true, but Reason (R) is false. **d)** Assertion (A) is false, but Reason (R) is true.
7	**Read the following statements carefully -Assertion (A) and Reason (R) and choose the correct alternative:** Assertion (A) -Economic problems involve the problem of making choices Reason (R) -It arises because of never-ending wants and their alternative uses. **a)** Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of (A) **b)** Assertion (A) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). **c)** Assertion (A) is true, but Reason (R) is false. **d)** Assertion (A) is false, but Reason (R) is true.
	STATEMENT-BASED QUESTIONS-
8	**Read the following statements carefully and choose the correct alternative given below:** Statement 1: Scarcity is the root cause of all economic problems. Statement 2: Human wants are limited. **Alternatives:** **a)** Statement 1 is true and statement 2 is false. **b)** Statement 2 is true and statement 1 is false. **c)** Both the statements are true **d)** Both the statements are false
9	**Read the following statements carefully and choose the correct alternative given below:** Statement 1: Economic activities involve earning of money. Statement 2: In the plural sense, statistics deals with the collection organization presentation interpretation, and analysis of data. **Alternatives:** **a)** Statement 1 is true and statement 2 is false. **b)** Statement 2 is true and statement 1 is false. **c)** Both the statements are true **d)** Both the statements are false

IMAGE-BASED QUESTIONS:

10 **Observe the given picture and identify the missing stages:**



11 Observe the given picture and identify which statement is a part of Statistics**.**



SHORT - ANSWER QUESTIONS 3 / 4 MARKS

12 "Statistics is the hub of the wheel of Economics".In light of this statement, briefly explain the functions of statistics

Ans-

	Functions of statistics Statistics helps in simplifying complex data by using various statistical methods • It presents economic facts in a precise and definite form • It helps in making comparisons it is used to study the relationship between various economic variables like demand and supply etc. • It helps in formulating economic plans and policies.
13	Statistics are numerical facts but all numerical facts are not statistics. Do you agree? Support your answer with a suitable example. **Ans.** I agree with the given statement. Statistics are figures but all figures or numerical facts are not statistics. **For example**: Saanvi has scored 25 marks in Economics is not statistics whereas the statement-average marks secured by students is 32 will be considered as statistics since it involves average.
14	The three conventional divisions of the study of Economics comprise the study of consumption production and distribution. Based on your understanding, explain the meaning of the following terms: **a.** Consumption **b**. Production **c.** Distribution **Ans:** **Consumption** -Process of using various goods and services to satisfy human wants **Production**- Process of converting inputs into output(goods and services) **Distribution** - Division of national income into factor incomes like wages, rent, interest, and profit.
15	Using examples explain the meaning of quantitative and qualitative data. **Ans.** **Quantitative data** -Data that can be measured in numerical terms like temperature height weight etc. **Qualitative data** - Data that cannot be measured directly in numerical terms like sincerity learning skills intelligence etc.
16	With the help of an example explain how the government and the policymakers use statistical data to formulate suitable policies for economic development. **Ans.** Today Statistics is increasingly being used to study various economic problems like inflation, poverty, unemployment, etc, and to find ways to solve them. For example, the Government and policymakers may decide to hike tax rates applicable to high-income groups (progressive taxation policy) to reduce economic disparity in India.
17	**Read the given text carefully and answer the question that follows:** Descriptive and inferential statistics are two fundamental branches of statistical analysis. Descriptive statistics focus on summarizing and describing data through measures like averages, percentages, and graphical representations. They provide a clear and concise snapshot of the main features of a dataset, such as its central tendency and variability. For example, mean and standard deviation are descriptive statistics used to understand the average and spread of data points in a dataset.

	In contrast, inferential statistics involve making predictions, generalizations, or conclusions about a population based on a sample of data. This branch utilizes probability theory and hypothesis testing to draw inferences about the larger population from which the sample is drawn. For instance, inferential statistics can help determine if a new drug is effective based on results from a clinical trial sample. It allows researchers and analysts to go beyond the specific data they have and make educated guesses or assertions about broader trends or phenomena. Together, descriptive and inferential statistics form the backbone of statistical analysis, providing tools for both summarizing data to understand its characteristics and making educated predictions or decisions based on that data. **a)** —----------statistics is used to summarize and describe the main features of a dataset. **b)** Give three points of difference between descriptive statistics and inferential statistics.
	Ans **a) Descriptive** **b) The three basic differences are:** 1) **Scope:** Descriptive statistics summarizes and describes data within a dataset, while inferential statistics conclude populations based on sample data. 2) **Methods:** Descriptive statistics use measures like averages and graphical representations to present data. Inferential statistics involve hypothesis testing, confidence intervals, and probability theory. 3) **Application:** Descriptive statistics are the basics for understanding data characteristics, whereas inferential statistics are crucial for making predictions and decisions based on data analysis
18	**Read the given text carefully and answer the question that follows:** The origin of statistics can be traced back to ancient civilizations, where rudimentary forms of data collection and analysis were utilized for administrative, economic, and social purposes. Early records suggest that the ancient Egyptians, Babylonians, and Chinese employed basic counting and recording techniques to manage resources, assess taxes, and predict natural events. In ancient Greece, scholars like Hippocrates used statistical methods to study disease patterns and mortality rates. The term "statistics" itself derives from the Latin word "status," meaning political state or condition, reflecting its early applications in governance and statecraft. The development of probability theory in the 17th century by mathematicians like Blaise Pascal and Pierre de Fermat laid the foundation for more rigorous statistical methods. Later, in the 19th and 20th centuries, pioneers such as Karl Pearson and Sir Ronald Fisher contributed significantly to the formalization of statistical theory and its application across diverse disciplines, solidifying statistics as a cornerstone of modern scientific inquiry and decision-making. Today, statistics continues to evolve with advances in computing and data science, playing an indispensable role in understanding and navigating the complexities of our interconnected world. **a)** Various methods of statistics were used in Greece to study —----------and —----------. **b)** In what way does Statistics continue to evolve today?
	Ans **a)** Disease patterns and mortality rates. **b)** Advancement in computing and data science is helping in the evolution of Statistics in the present times, thereby playing an indispensable role in understanding and navigating the complexities of our interconnected world.

ANSWERS TO MCQs	
1.	**a)** Marks code by Saumya was 14% higher than Manish
2.	**b)** Statistics are true only on an average
3.	**d) C**reativity
4.	**c)** ii , iii, iv, v, i
5.	**c)** Consumer
6.	**c)** Assertion (A) is true, but Reason (R) is false.
7.	**a)** Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of (A)
8.	**b)** Statement 2 is true and statement 1 is false.
9.	**a)** Statement 1 is true and statement 2 is false
10	**Stage 3-** Presentation of data **& Stage 5 -**Interpretation of data
11	**B)** She has a brother who is 3 years younger than her.

UNIT 2: COLLECTION, ORGANISATION AND PRESENTATION OF DATA

MIND MAPPING OF COLLECTION OF DATA

Statistical enquiry: Means a search conducted by using statistical method to collect quantitative information

There two sources of data

1. Primary Source
2. Secondary Source

Primary data - Data originally collected by the investigator.
Secondary data- It is the data which is already exists and which collected for some other purpose.

Method of collecting primary data

1. Personal interview method
2. Mailing Questionnaire method
3. Telephone interview method

Sources of secondary data

Published sources
1. Govt. publication
2. semi-Govt. Publication

Sources of secondary data

Published sources
1. Govt. publication
2. semi-Govt. Publication
3. Reports of committees & commissions

Unpublished Sources
records maintained by private firms, business enterprises, scholars, research workers, etc.

Methods of sampling:
Random sampling- It is that method of sampling in which each and every item of the universe has equal chance of being selected in the sample. It is also called as lottery method.
Non-Random sampling- Includes all those methods of sampling in which all units of population do not have equal chance of being selected in the sample

Census of India- It provides most complete and demographic record of population.
Sample survey- In this method a group of units representing all the units of the population is

Sampling Errors: Sampling error is the difference between the result of studying a sample and the result of the census of the whole population.

Non-Sampling Error- Can occur in any type of survey whether it be a census or sample survey

COLLECTION OF DATA

Data is a collection of facts and measurement.
Data is a tool which helps in reaching a sound conclusion by providing information therefore. For statistical investigation, collection of data is the first and foremost.

Sources of Data
1. Primary Source
2. Secondary Sources
a. Published sources
b. Un-published sources

Primary Data– Data originally collected in the process of investigation are known as primary data. This is original form of data which are collected for the first time. It is collected directly from its source of origin.

Methods of collecting primary data
There are three basic ways of collecting data:
(i) Personal interview OR Direct Personal Investigation
(ii) Mailing (questionnaire surveys)
(iii) Telephone interviews

Personal Interview Method/ Direct Personal Investigation Method

Meaning: In this method the investigator/researcher collect the data personally/ directly from the responded.

Advantage	Disadvantage
• High rate of response	• Most expensive
• Allows use of all types of questions	• Possibilities of influencing responded
• Better for using open-ended questions	• Consume more time and energy

Mailed Interview

Meaning: In this method the investigator collects the data through mailing questionnaire.

Advantage	Disadvantage
• Least expensive	• Cannot be used by illiterates
• Only method to reach remote areas	• Long response time
• No influence on responded	• Reactions cannot be watched

Telephone interviews

Meaning: The investigator collects the data through telephones.

Advantage	Disadvantage
• Relatively low cost	• Limited use
• Less influence on responded	• Reaction cannot be watched
• Relatively high response rate	• Possibility of influencing responded

Difference between Primary and Secondary data:

Basis for comparison	Primary Data	Secondary Data
Meaning	Primary data refer to the first-hand data gathered by the researcher himself.	Secondary data means data collected by someone else earlier.
Data	Real time data	Past data
Process	Very involved	Quick and easy
Source	Surveys, observations, experiments, questionnaire, personal interview, etc.	Government publications, websites, books, journal articles, internal records etc.
Cost effectiveness	Expensive	Economical
Collection time	Long	Short
Specific	Always specific to the researcher's needs.	May or may not be specific to the researcher's need.
Accuracy and Reliability	More	Relatively less

Secondary data - It refers to collection of data by some agency, which already collected the data and processed. The data thus collected is called secondary data.

Sources of secondary data

Published sources
1. Govt. publication
2. semi-Govt. Publication
3. Reports of committees & commissions
4. Private publications e.g., Journals and Newspapers research institute, publication of trade association.
5. International publications

Unpublished Sources
The statistical data needn't always be published. There are various sources of unpublished statistical material such as the records maintained by private firms, business enterprises, scholars, research workers, etc. They may not like to release their data to any outside agency.

Important points to be kept in mind while drafting the questionnaire
A. Introduction and purpose of investigation
B. Reasonable number questions.
C. Questions should be small & clear.
D. Questions should be arranged logically.

E. Instructions should be clear.
F. Proper space for answer.
G. Questions should be relevant to the investigation.
H. Personal questions should be avoided.
I. Avoid questions of calculations.
J. Cross Verification.
H. The question should not be ambiguous.
I. The question should not use double negative like “don’t you”.
J. The question should not indicate alternative answers.

Pilot Survey: Before sending the questionnaire to the information. It should be pretested. As a result of its short comings if any, can be removed. Such pretesting named as pilot survey.
A pilot survey is a preliminary survey used to gather information prior to conducting a survey on a larger scale. Pilot surveys, typically taken by smaller groups, help determine the efficiency of the future survey while also helping organizations smooth out difficulties before administering the main survey.

Methods of sampling:
1. **Random sampling**: It is that method of sampling in which each and every item of the universe has equal chance of being selected in the sample. It is also called as lottery method.
a. Simple or unrestricted random sampling
b. Restricted random sampling
i. Stratified
ii. systematic
iii. multistage or cluster sampling
2. **Non-Random Sampling:** Includes all those methods of sampling in which all units of population do not have equal chance of being selected in the sample
a. Judgment sampling
b. Quota sampling
c. Convenience sampling

Census survey: In this method every element of population is included in the investigation.
Sample survey: In this method a group of units representing all the units of the population is investigated.

Basis for comparison	**Census**	**Sampling**
Meaning	A systematic method that collects and records the data about the members of the population is called Census.	Sampling refers to a portion of the population selected to represent the entire group, in all its characteristics.
Enumeration	Complete	Partial
Study of	Each and every unit of the population	Only a handful of units of the population.
Time required	It is a time-consuming process.	It is a fast process.
Cost	Expensive method	Economical method
Results	Reliable and accurate	Less reliable and accurate, due to the margin of error in the data collected.
Error	Not present.	Depends on the size of the population
Appropriate for	Population of heterogeneous nature.	Population of homogeneous nature.

Population or universe
In Statistics, population or universe simply refers to an aggregate of items to be studied for an investigation.
Sample: A group of items taken from the population for investigation and representative of all the items.

SAMPLING AND NON-SAMPLING ERRORS

Sampling Errors: Sampling error is the difference between the result of studying a sample and the result of the census of the whole population.

Non-Sampling Error: Can occur in any type of survey whether it be a census or sample survey.
Non-sampling errors
1. Error in data acquisition: This type of error arises from recording of incorrect responses. Suppose, if a teacher asks the students to measure the length of the teacher's table in the classroom. The measurement by the students may differ. The differences may occur due to differences in measuring tape, carelessness of the students, etc.
2. Non-Response error: Non-response occurs if an interviewer is unable to contact a person listed in the sample or a person from the sample refuses to respond. In this case, the sample observation may not be representative
3. Sampling Bias: Sampling bias occurs when the sampling plan is such that some members of the target population could not possibly be included in the sample.

Census of India and National Sample Survey Organization:
The census of India provides the complete and continuous demographic record of population.
Population census, known as the census, is the process of collecting, compiling and analyzing the data on economic, social, or demographic areas at a specific period of a particular area or in the whole country. It provides data about the recent trend in the population and the situation of the country or any place. The census of India is one of the largest administrative exercises undertaken in the world. In India, the population census is done at a specific time interval of every 10 years.
The NSSO was established by the Govt. of India to conduct nationwide survey on socio-economic issues like employment, literacy, maternity, child care, utilization of public distribution system etc.
The data-collected by NSSO survey are released through reports and its quarterly journal ''Sarvekshana''. Eg. Size, growth rate, distribution of population, density, population, projections, sex composition and literacy. These data are used by govt. of India for planning purpose.

MULTIPLE CHOICE QUESTION

1. …… data was collected directly from the investigator from the responded.
    a) Primary data
    b) Secondary data
    c) Sample data
    d) One of the above
2. Data collected by an economics student from the government publication to prepare a project report is a ……
    a) Primary data
    b) Secondary data
    c) Sample data
    d) None of the above
3. Pre-testing of the questionnaire is called as……
    a) Mailing questionnaire
    b) Census
    c) Sampling survey
    d) Pilot Survey
4. India Express TV-CNX opinion poll shows most of the seats in India is expected to win by BJP and also the various other news channels predict the same. The finding of the opinion polls of various news channels are based on.
    a) Secondary data
    b) Sample data
    c) Census
    d) None of the above

5. The researcher gives each member of the population a number and researchers draw number from the box randomly to choose samples and it is also called as…….
    a) Sample survey method
    b) Census
    c) Lottery method
    d) None of the above
6. Which of the following statement is false?
    a) Primary data are collected from source of origin
    b) Secondary data do not need any adjustment
    c) Secondary data are not collected from the source of origin
    d) Primary data are costlier in terms of time, money ad efforts.

7. Read the following statements carefully and choose the correct alternatives given below:
    Statement 1 – Primary data are original in character.
    Statement 2 – Data are collected by the investigator for his own purpose for the first time.
    Alternatives:
    a) Both statements are true.
    b) Both statements are false.
    c) Statement 1 is true and Statement 2 is false.
    d) Statement 2 is true and Statement 1 is false.
8. Read the following statements carefully and choose the correct alternatives given below:
    Statement 1 – Technique which gives every item of the universe an equal chance of being selected is called as Non-random sampling.
    Statement 2 – The most complete and continuous demographic record of population is provided by 'National Sample Survey Organisation'.
    Alternatives:
    a) Both statements are true.
    b) Both statements are false.
    c) Statement 1 is true and Statement 2 is false.
    d) Statement 2 is true and Statement 1 is false.
9. Read the following statements carefully and choose the correct alternatives given below:
    Statement 1 – The survey which helps in pre-testing of questionnaire is called as pilot survey.
    Statement 2 – The greatest demerit of mailing questionnaire is that the responded may don't not answer the questions, do not through it carefully and there is chances of misunderstand and misinterpretation of questions.
    Alternatives:
    a) Both statements are true.
    b) Both statements are false.
    c) Statement 1 is true and Statement 2 is false.
    d) Statement 2 is true and Statement 1 is false.
10. Read the following statements carefully and choose the correct alternatives given below:
    Statement 1 – Sample method provides better results than survey.
    Statement 2 – Sample collect information from every individual from the universe.
    Alternatives:
    a) Both statements are true.
    b) Both statements are false.
    c) Statement 1 is true and Statement 2 is false.
    d) Statement 2 is true and Statement 1 is false.

11. There are two statements given below, marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

    Assertion (A): The most common type of instrument used in surveys is questionnaire.

    Reason (R): The questionnaire may consist of closed-ended (or structured) questions or open-ended (or unstructured) questions. Closed-ended questions are easy to use, score and to codify for analysis, because all respondents can choose from the given options and Open-ended questions allow for more individualized responses.

    a) Both Assertion (A) and Reason (R) is true but Reason (R) is the correct explanation of Assertion (A)
    b) Both Assertion (A) and Reason (R) is true but Reason (R) is not the correct explanation of Assertion (A).
    c) Assertion (A) is true but Reason (R) is false.
    d) Assertion (A) is false but Reason (R) is true.

12. There are two statements given below, marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

    Assertion (A): The purpose of the sample is to get one or more estimate of the population parameters.

    Reason (R): A good sample (representative sample) is generally smaller than the population and is capable of providing reasonably accurate information about the population at a much lower cost and shorter time.

    a) Both Assertion (A) and Reason (R) is true but Reason (R) is the correct explanation of Assertion (A)
    b) Both Assertion (A) and Reason (R) is true but Reason (R) is not the correct explanation of Assertion (A).
    c) Assertion (A) is true but Reason (R) is false.
    d) Assertion (A) is false but Reason (R) is true.

13. There are two statements given below, marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

    Assertion (A): Sampling error refers to the difference between the sample estimate and the corresponding population parameter (actual value of the characteristic of the population for example, average income, etc).

    Reason (R): sampling errors are more serious than Non-sampling errors because a Non-sampling error can be minimized by taking a larger sample. It is difficult to minimize non-sampling error, even by taking a large sample.

    a) Both Assertion (A) and Reason (R) is true but Reason (R) is the correct explanation of Assertion (A)
    b) Both Assertion (A) and Reason (R) is true but Reason (R) is not the correct explanation of Assertion (A).
    c) Assertion (A) is true but Reason (R) is false.
    d) Assertion (A) is false but Reason (R) is true.

14. There are two statements given below, marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.

    Assertion (A): Sampling bias arises from recording of incorrect responses.

    Reason (R): Non-response occurs if an interviewer is unable to contact a person listed in the sample or a person from the sample refuses to respond.

    a) Both Assertion (A) and Reason (R) is true but Reason (R) is the correct explanation of Assertion (A)
    b) Both Assertion (A) and Reason (R) is true but Reason (R) is not the correct explanation of Assertion (A).
    c) Assertion (A) is true but Reason (R) is false.
    d) Assertion (A) is false but Reason (R) is true.

ANSWERS:

1. a) Primary data
2. b) Secondary data
3. d) Pilot Survey
4. b) Sample data
5. c) Lottery method
6. b) Secondary data do not need any adjustment.
7. a) Both statements are true.
8. d) Statement 2 is true and Statement 1 is false.
9. a) Both statements are true.
10. c) Statement 1 is true and Statement 2 is false.
11. a) Both Assertion (A) and Reason (R) is true but Reason (R) is the correct explanation of Assertion (A).
12. b) Both Assertion (A) and Reason (R) is true but Reason (R) is not the correct explanation of Assertion (A).
13. c) Assertion (A) is true but Reason (R) is false.
14. d) Assertion (A) is false but Reason (R) is true.
15.

VERY SHORT ANSWERS

1. What is statistical investigation?
   Ans. Statistical investigation means finding solution with help of statistical methods.
2. Define data?
   Ans. Data is a collection of facts and measurement.
3. What do you mean by primary data?
   Ans. Primary data are the original data which are directly collected by investigator himself.
4. What do you mean by secondary data?
   Ans. Secondary data are those data which are collected by other sources.
5. What is census?
   Ans. Census refers to it is a complete enumeration of individual data.
6. Expand NSSO.
   Ans. National Sample Survey Organization
7. What is Sample?
   Ans. A group of items taken from the population for investigation and representative of all the items.
8. What do you mean by sampling errors?
   Ans. Sampling error is the difference between the result of studying a sample and the result of the census of the whole population.
9. What is Sampling Bias?
   Ans. Sampling bias is the collection of samples that do not accurately represent the entire group
10. What is meant by random sampling?
    Ans. Radom sampling is that method of sampling in which each and every item of the universe has equal chance of being selected in the sampling.

SHORT TYPES ANSWERS

1. An investigator has collected the required information by personal interview with the informant. What type of data will it be called? Mention its two features.
   Ans. Information collected is an example of primary data.
   Features of primary data are as follows:
   a) Data are collected by the investigator for his own purpose for the first time.
   b) This is the first- hand information.
   c) They are original because information is collected from the source of origin.
   d) It is costly in terms of time, efforts and money.

2. The NGOs (Non-Governmental Organization) is interested in determining the level of education unmarried girls in the country. How would you like to organize a survey for this purpose?
   Ans. I would like to organize a survey such as:
   a) Selecting the population size
   b) Deciding the type survey census or sample survey
   c) Selecting the method of collection of data

3. Write any four difference between primary data and secondary data.
   Ans.

Basis for comparison	**Primary Data**	**Secondary Data**
Meaning	Primary data refer to the first-hand data gathered by the researcher himself.	Secondary data means data collected by someone else earlier.
Data	Real time data	Past data
Process	Very involved	Quick and easy
Source	Surveys, observations, experiments, questionnaire, personal interview, etc.	Government publications, websites, books, journal articles, internal records etc.
Cost effectiveness	Expensive	Economical

4. What are the sources of secondary data? Name any four sources of secondary data.
   Ans. Secondary data can be obtained from two sources namely,
   a) Published sources of data
   b) Unpublished sources of data
   Four sources of secondary data are:
   - Government publications
   - Journals and newspapers
   - Websites etc.

5. What are the limitations of Secondary data?
   Ans. One should use the secondary data with care and full precaution and should not accept them at their face value as they may be suffering from the following limitations:
   a) Data may not have been collected by following the proper procedure.
   b) Data collected may not be suitable for the required purpose. The information which was collected on a particular base may not be suitable and relevant to an enquiry.
   c) The data may have been influenced by biased investigation or personal prejudices.
   d) It may be obsolete and not suitable to the present period.
   e) It may not satisfy a reasonable standard of accuracy.
   f) Collected data may not cover the full period of investigation

6. State the two merits and demerits of collection data by ‘personal interview method’.
   Ans. The merits of collection data by ‘personal interview method’.

Merits	**Demerits**
• High rate of response	• Most expensive

• Allows use of all types of questions	• Possibilities of influencing responded

7. 'Do you agree how a manufacturing decides a product how political party decides about a candidate? They conduct a survey by asking questions or candidates from a large group of people. The purpose of surveys is to describe some characteristics like price, quality, usefulness and popularity etc'. The most common type of instrument used in surveys is questionnaire/interview schedule. You must keep some points while making a questionnaire. Mention some four important points to be kept in mind while drafting the mailing questionnaire.

   Ans. Four important points to be kept in mind while drafting the mailing questionnaire they are:
   a) Questions should be small & clear.
   b) Questions should be arranged logically.
   c) Instructions should be clear.
   d) Questions should be relevant to the investigation.
   e) Personal questions should be avoided.

8. What do you mean by telephone interview method? State any two merits of telephone interview method.
   Ans. When the investigator collects the data through telephones.

Advantage	**Disadvantage**
• Relatively low cost	• Limited use
• Less influence on responded	• Reaction cannot be watched
• Relatively high response rate	• Possibility of influencing responded

9. Do samples provide better results than surveys? Give reasons for your answer.
   Ans. Samples and surveys have their applicability and usability as the nature and purpose of investigation. Both have their own merits and demerits.
   a) Samples provide reliable information selected scientifically.
   b) These are less costly in terms of time, money and efforts.
   c) Errors can be easily detected and modified due to smaller number of items selected.

10. Which of the following errors - Sampling error or Non-sampling error is more serious and why?
    Ans. Non-sampling errors are more serious than sampling errors because a sampling error can be by taking a larger sample but it is difficult to minimize non-sampling error, even by taking a large sample. Even a Census can contain non-sampling errors. These include errors in data acquisition, non-response errors and sampling bias.

11. Write a short note on National Sample Survey Organization.
    Ans. NSSO is a government organization under the Ministry of Statistics and Programme Implementation. The National Sample Survey (NSS), initiated in the year 1950, is a nationwide, large scale continuous survey operation conducted in the form of successive rounds. It was established on the basis of a proposal from Prof. P.C. Mahalanobis to fill up data gap for socio-economic planning and policy making through sample surveys. On March 1970, the NSS was reorganized and known as the National Sample Survey Office. The NSSO headed by a Director General Chief Executive Officer.

LONG ANSWER TYPE QUESTIONS

1. Why is sample survey method preferred over census survey method? Give example where census method is inevitable and where sample methods are suitable to collect data.
   Ans. Sample survey method preferred over census survey method because for various reason such as:
   a) Sample survey is preferred over census survey because it reduces cost both monetary terms and staffing requirements.
   b) It reduces time needed to collect and process the data and produce results as it requires a smaller scale of operation.
   c) Whereas Census or complete enumeration method is inevitable where detailed information about the respondent is highly necessary or that of the information is needed to be original from the point of view of framing policies like socio-economic data are required by the government or census survey.

2. As a Project Leader you have start a project work in the class. Project work is to be done in the group of five. In order to ensure inclusivity which sampling technique would you use? State its three benefits.
   Ans. Random sampling should be used.
   Each and every unit of population has equal chance of getting selected in the sample This method is used when population is homogeneous in nature.
   a) It is economical in terms of time, efforts and money
   b) It is time saving
   c) It is possible when area of investigation is large.

3. State and demerits of mailing questionnaire method of collecting data.
   Ans. mailing questionnaire method, a list of questions pertaining to the investigation is prepared and sent to each informant by mail with a request to complete and return it by a given data. The informants write the answers against the questions and return the completed questionnaires to the investigator.
   Merits:
   a) Less expensive: It is relatively less expensive than other methods.
   b) Wider area: It is the only method where the field of investigation is very vast and the information is spread over a wide geographical area.
   c) No possibility of personal bias: There is any room for personal bias and prejudice on the part of the investigators.
   d) Originality: This method is original and fairly reliable, because the information is supplied by the concerned persons themselves.

   Demerits:
   a) Limited use: This method cannot be used when the informants are illiterate or uneducated.
   b) Low response rate: It involves some uncertainty about the response. In many cases, the respondents do not return the questionnaire.
   c) Lack of flexibility: This method lacks flexibility because, when questions are not properly replied, these cannot be changed to obtain the required information.
   d) Not accurate data: The information supplied by the informants may not be correct and it may be very difficult to verify the accuracy.

4. Write any six difference between census and sample survey method.
   Ans.

Basis for comparison	**Census**	**Sampling**
Meaning	A systematic method that collects and records the data about the members of the population is called Census.	Sampling refers to a portion of the population selected to represent the entire group, in all its characteristics.

Enumeration	Complete	Partial
Study of	Each and every unit of the population	Only a handful of units of the population.
Time required	It is a time-consuming process.	It is a fast process.
Cost	Expensive method	Economical method
Results	Reliable and accurate	Less reliable and accurate, due to the margin of error in the data collected.
Error	Not present.	Depends on the size of the population
Appropriate for	Population of heterogeneous nature.	Population of homogeneous nature.

CASE BASED QUESTION

I) Unpublished data or literature is known as grey literature in research.
(The term organisations and others, generally for their self-use or office record. Unpublished data is useful mainly in secondary research, such as literature reviews and systematic reviews. It provides pointers to new research and perhaps also research paths to avoid. Preprints are a growing form of unpublished data these days and have proved very useful in guiding research in critical areas such as Covid -19. published source of data are government publications, semi-government publications, publications of research institutions, international publications etc.

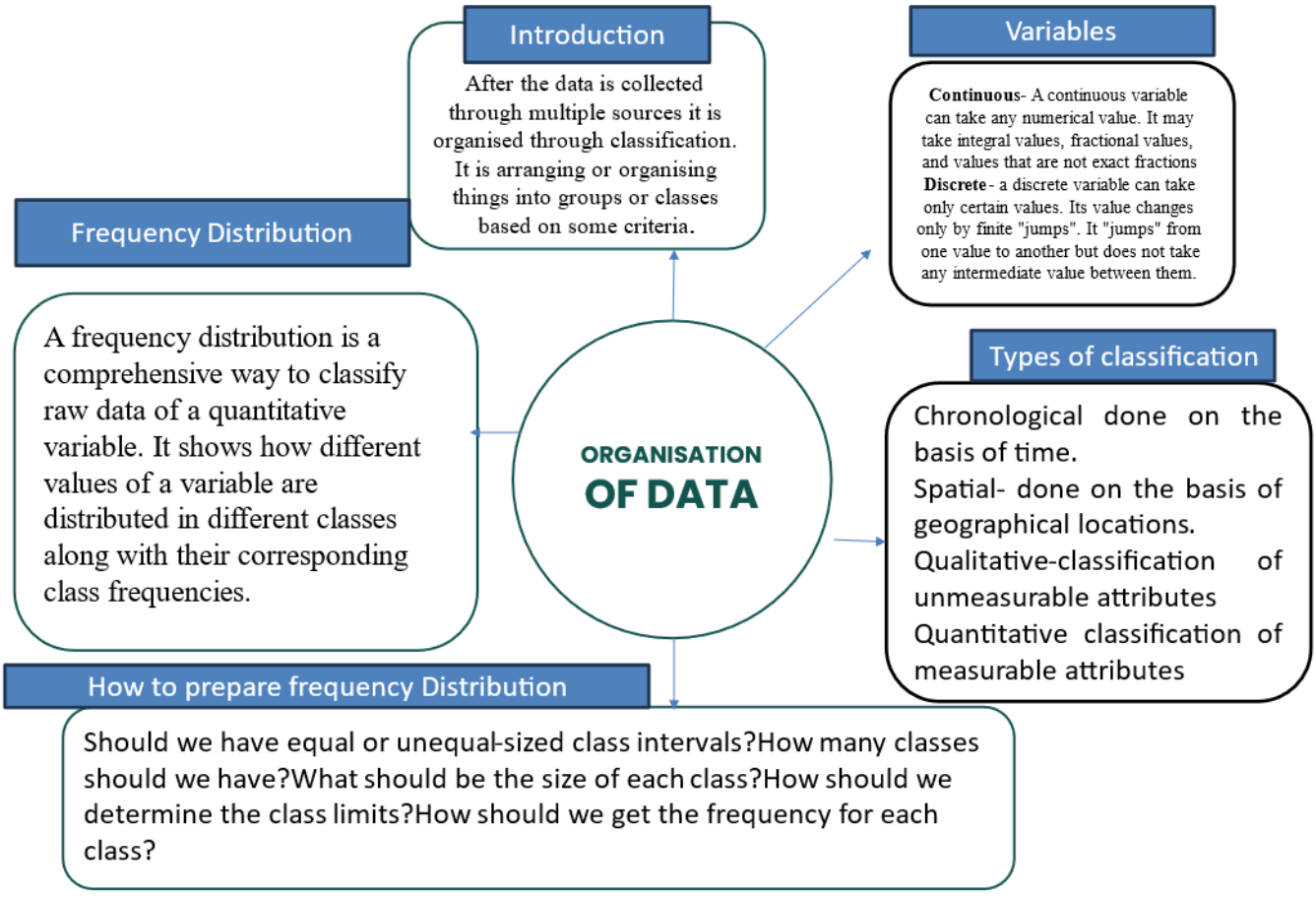
1. What is the importance of using unpublished data as a secondary data source?
   Ans. Unpublished data is useful mainly in secondary research.
   a) It provides pointers to new research and perhaps also research paths to avoid.
   b) It proved very useful in guiding research in critical areas such as Covid -19 by published by, government publications.
2. What are the disadvantages of secondary data?
   Ans. Disadvantages of secondary data they are:
   a) your use of the data and its validity will highly depend on the quality of the secondary sources used.
   b) Information may not quit fit the same frame or boundaries as your primary data collection.
   c) The data may address some issues, criteria or indicators but not others
   d) Concepts used may not be the same.

II) The Census of India provides the most complete and continuous demographic record of population. The Census is being regularly conducted every ten years since 1881. The first Census after Independence was conducted in 1951. The Census officials collect information on various aspects of population such as the size, density, sex ratio, literacy, migration, rural-urban distribution, etc. The NSS was established by the Government of India to conduct nationwide surveys on socio-economic issues to interpret and analyze and to understand many economic and social issues in India. The data collected by NSS are released through reports and its quarterly journal Sarvekshana. NSS provides periodic estimates of literacy, school enrolment, utilization of educational services, employment, unemployment, manufacturing and service sector enterprises, morbidity, maternity, child care, utilization of the public distribution system etc., The NSS also collects details of industrial activities and retail prices for various goods. They are used by Government of India for planning purposes.

1. When was first census of India was conducted after independence? Out of the census and sampling, which method take more time and energy.
   Ans. The first census of India was conducted in the 1951. Census take more time and energy because data is collected from each and every individual of the population.
2. Throw the light on the agency at national level providing most complete and continuous demographic record of the population.
   Ans. the agency at national level are:
   a) Census of India is the national level agency which provides most comprehensive demographic record of the population.

b) The census is being conducted regularly every once in ten years since 1881.
c) The first census after independence was conducted in 1951.
d) Census data is interpreted and analyzed basically to understand many economic and social issues in India.

ORGANIZATION OF DATA



The process of arranging data according to their characteristics is known as classification of data.
Objectives

- To simplify the complex data
- To facilitate comparison
- To make analysis and interpretation easy
- To study the cause-and-effect relationship.

TYPES OF CLASSIFICATION

1. Geographical classification: Data is classified according to geographical location or region. E.g. Population of different states.
2. Chronological classification: Data is classified on the basis of time.
   E.g. Production of a firm for different years.
3. Qualitative classification: Data is classified on the basis of certain characteristics or attributes which cannot be quantified. E.g. Religion, caste, honesty
4. Quantitative classification: Classification is done on the basis of numerical values of the facts. (data which can be numerically measured)
   E.g. Height, weight, income, sales etc

VARIABLE

A variable refers to that quantity which is subject to changes and which can be measured by some unit. E.g. Price is a variable as prices of different commodities is different.
A variable may be either discrete or continuous.

FREQUENCY: Number of times a given value appears in a distribution. Eg.,4 students have got 65marks in subject Economics, here frequency is 4

FREQUENCY DISTRIBUTION: A table in which the frequencies and the associated values of a variable are written side by side, is known as a frequency distribution.

RAW DATA: The data obtained in the original form is called raw data. Raw data are classified in the form of series. The arrangement of classified data in a logical order, such as size or time of occurrence, or according to some measurable or non-measurable characteristics, is known Statistical Series.

- **INDIVIDUAL SERIES**: The series in which the items are listed singly is known as Individual Series. In simple terms, a separate value of the measurement is given to each item series the two types of individual series are **Unorganised Individual Series** and **Organised Individual Series.**
  Unorganised Individual Series: A series with raw data or an unarranged mass of data is known as Unorganised Series. E.g., Marks obtained by 10 students in a class in Economic- 21, 30,42, 35, 45,19, 28, 36, 44, 27
  Organised Individual Series: A series with orderly arranged raw data is known as Organised Individual Series. E.g. Mark distribution of 25 students as per serial number.

- **DISCRETE SERIES (UNGROUPED FREQUENCY DISTRIBUTION)**:

  A discrete series is that series where individual values differ from each other by definite amount.

  In such series there are no class intervals, and a particular item in the series is numbered rather than measured with some range.
  For example: Marks of 25 students in Economics (out of 25 marks)

  16,13,15, 14, 14, 17, 16, 15, 17, 16,15, 16,17, 14, 17,15, 16, 13, 16, 17, 17,14,16,15,16

Score(x)	Tally Marks	Frequency
13	||	2
14	||||	4
15	||||	5
16	|||| |||	8
17	|||| |	6
Total		25

- **CONTINUOUS SERIES (GROUPED FREQUENCY DISTRIBUTION)**

A continuous series is that series which represents continuous variables, showing range of variables of different items of the series.

Class Interval	Tally Marks	Frequency
150-200	||	2
200-250	|||	3
250-300	|||| |	6
300-350	||||	5
350-400	|||| ||	7
400-450	||||	4
450-500	|||	3
Total		30

Discrete Variable: A variable is called discrete if the variable can take only some particular values or jumps in complete number.

Continuous Variable: A variable is called continuous if it can take any value in a given range. In constructing continuous series, we come across terms like:
Class: A group of numbers in which items are placed such as 0-10, 10-20 etc.
Class limit: The lowest and highest values of the variables within a class is called class limit. E.g., 0-10 lower limit 0, upper limit 10
Class interval: Difference between upper limit and lower limit of the class.
E.g., 0-10, CI = 10-0=10
Range: Difference between the lower limit of first class and upper limit of the last class. E.g., If classes are 0-10, 10-20, 20-30……till 70-80, then range is 80-0=80

Mid-point or Mid Value: $\frac{\text{Upper limit + Lower limit}}{2}$

E.g., midpoint of class 10-20 will be 10+20/2 = 30/2 =15
Types of continuous series
1.Exclusive series
2. Inclusive series

3. Open end distribution
4. Cumulative frequency series

Exclusive Method: Under this method, the class intervals are so fixed that the upper limit of one class is the lower limit of the next class.

Marks	Frequency
100 - 200	70
200 – 300	110
300 – 400	89
400 - 500	57

In this example, a student whose marks are 200 is included in the class 200 – 300 and not in the class 100 – 200. This is because upper limit of each class is excluded from that class.

Inclusive Method: Under this method of determining limits of class intervals, the upper limit of one class is included in the class itself.

Marks	Frequency
10- 19	70
20 – 29	110
30 – 39	89
40 - 49	57

In the class 100 – 199, a student whose marks are between 100 and 199 will be included. But a student with 200 marks will be included in the next class 200 – 299.

Conversion of Inclusive series into Exclusive series:

Inclusive series are used when there is some definite difference between the values of various items in the population. Following steps are involved in the conversion of an inclusive series into an exclusive series.

(i) First, we find the difference between the upper limit of class interval and the lower limit of next class interval.

(ii) Half of that difference is added to the upper limit of a class interval and half is subtracted from the lower limit of the class interval.

Open End Series: An open-end series is that series in which lower limit of the first-class interval and the upper limit of last class interval is missing. E.g.:

Marks	Frequency
Below 5	1
5 – 10	3
10 – 15	4
15 – 20	6
20 and above	1

Cumulative Frequency Series: Cumulative frequency series is that series in which the frequencies are continuously added corresponding to each class interval in the series.

Marks	Frequency
5 - 10	3
10 - 15	8
15 – 20	4
20 – 25	4

There are two ways of converting this series into cumulative frequency series:
Cumulative frequencies may be expressed on the basis of upper limit of the class intervals. Eg: less than 10, less than 15 and so on.

Marks	No. of students
Less than 10	3
Less than 15	3 + 8 = 11
Less than 20	3 + 8 + 9 = 20
Less than 25	3 + 8 + 9 + 4 = 24
Less than 30	3 + 8 + 9 + 4 + 4 = 28

Cumulative frequency may be expressed on the basis of lower-class limits of the class intervals. Eg: more than 5, more than 10 and so on.

Marks	No. of students
More than 5	28
More than 10	28 – 3 = 25
More than 15	25 – 8 = 17
More than 20	17 – 9 = 8
More than 25	8 – 4 = 4
More than 30	4 – 4 = 0

Bivariate Frequency Distribution

Frequency distributions involving single variable only. Such frequency distributions are called univariate frequency distributions. A frequency table where two variables have been measured in the same set of items through cross classification is known as 'bivariate frequency distribution' or 'two-way frequency distribution'.

MULTIPLE CHOICE QUESTIONS

1. Classification method in which upper limit of interval is same as of lower limit class interval is called
   (a) Exclusive method
   (b) Inclusive method
   (c) Mid-point method
   (d) Ratio method
2. Class limits means
   (a)Sum of upper or lower limits
   (b)A range of values which incorporates a set of items
   (c)Extreme values of a class are limits
   (d) Difference between upper or lower limits
3. The frequency distribution of two variable is known as
   (a) Univariate frequency distribution
   (b) Discrete frequency distribution
   (c) Bivariate frequency distribution
   (d) Inclusive frequency distribution
4. The number of observations falling within a class is called:
   (a) Frequency
   (b) Class interval
   (c) Mid value
   (d) Density

5. When data is classified on the basis of area, it is
   (a) Qualitative classification (b) Geographic classification
   (c) Quantitative classification (d) Chronological classification
6. Read the following statements carefully:
   In the light of the given statements, choose the correct alternative from the following:
   a) Statement 1 is true and statement 2 is false
   b) Statement 1 is false and statement 2 is true
   c) Both statements 1 and 2 are true
   d) Both statements 1 and 2 are false
   Statement 1: Frequency curve is a graphic representation of a frequency distribution.
   Statement 2: The Class Mid-Point or Class Mark is the extreme value of a class.
7. Statement 1: A discrete variable can take only certain values.
   Statement 2: Its value changes only by finite "jumps"

   Read the following statement -Assertion (A) and Reason (R). Choose one of the correct alternatives given below:
   Alternatives:
   (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
   (b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
   (c) Assertion (A) is true but Reason (R) is false.
   (d) Assertion (A) is false but Reason (R) is true.

8. Assertion(A): Income of an individual is a variable
   Reason(R): Variable means the characteristic which subject to change.

9. Assertion(A): chronological classification is based on locations.
   Reason(R): In qualitative classification, data is classified on the basis of some attribute or quality.
10. Assertion (A): Classification is the process of arranging data into sequence and groups.
    Reason (R): Data are classified according to their common characteristics for separating them into different but related parts.
11. Range is the
    (a) Difference between the smallest and the largest observation
    (b) Difference between the largest and the smallest observation
    (c) Average of the largest and the smallest observation
    (d) Ratio of the largest to smallest observation
12. Statistical calculations in classified data are based on
    (a) The actual values of observations
    (b) The upper class limits
    (c) The lower class limits
    (d) The mid points
13. The frequency distribution of a continuous variable is known as:
    (a) Grouped frequency distribution
    (b) Simple frequency distribution
    (c) Either(a) or (b)
    (d) Both (a) and (b)
14. An attribute is
    (a) A quantitative characteristic
    (b) A measurable characteristic

(c) A qualitative characteristic
(d) Either(a) or (b)

15. If the mid values are given as: 15,25, 35,45,55, then first class of the distribution is:
(a) 20-25 (b) 10-20
(b) 20-30 (d)10-15

ANSWERS

1. (a) Exclusive method
2. (c)Extreme values of a class are limits
3. (c) Bivariate frequency distribution
4. (a) Frequency
5. (b) Geographic classification
6. (a) Statement 1 is true and statement 2 is false
7. (c) Both statements 1and 2 are true
8. (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
9. (d) Assertion is false but Reason is true
10. (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
11. (b) Difference between the largest and the smallest observation
12. (a) The actual values of observations
13. (a)Grouped frequency distribution
14. (c) A qualitative characteristic
15. (b)10-20

CASE STUDY

16. Analysis the following case study table carefully and answer the questions on the basis of same**.**

Marks	No. of students
5-10	1
10-15	2
15-20	4
20-25	6
25-30	8
30-35	10
35-40	11
40-45	6
45-50	2

a) Which class of marks has maximum frequency?
b) The above series is an example of _____ (exclusive/inclusive) series.
c) How many students got 45-50 marks?

d) The above situation shows which of the following types of presentation of data?
(a) Chronological classification (b) Spatial classification
(c) Quantitative classification (d) Qualitative classification
e) What are the class limits of the 5^{th} class?

Answers: a) 35-40 b) exclusive c) 2 d) Quantitative classification
e) lower limit=25
upper limit=30

17. Read the following case carefully and answer the questions on the basis of same:

Classification is the grouping of related facts into classes. Facts in one class differ from those of another class with respect to some characteristics is called classification. classification of data is a function very similar to that of sorting letters in a post office. Classification condenses mass data in such a manner that similarity and dissimilarity can be readily apprehend. It helps in comparison. Classification can be done on the basis of location, time quality or measurement.

a) under which stage classification of data comes?
b) what are the uses of classification of data
c) why data are classified?

Answers: a) second
b) simplify the complex data, facilitate comparison, to make analysis and interpretation easy and study the cause-and-effect relationship
c)data are classified to present data in brief and simple form.

18. Use the data in the following table that relate to monthly household expenditure (in RS) on food of 50 households and

i. Obtain the range of monthly household expenditure on food.
ii. Divide the range into appropriate number of class intervals and obtain the frequency distribution of expenditure
iii. Find the number of households whose monthly expenditure on food is
   a) Less than 2000
   b) More than 3000
   c) Between 1500 and 2500

Answers:

i. Range = Highest value -Lowest value

Highest Value = 5090
Lowest Value = 1007
So, Range = 5090 – 1007 = 4083

ii.

Class intervals	Tally marks	Frequency
1000-1500	𝍸 𝍸 𝍸 𝍸	20
1500-2000	𝍸 𝍸 |||	13
2000-2500	𝍸 |	06
2500-3000	𝍸	05
3000-3500	||	02
3500-4000	|	01
4000-4500	||	02
4500-5000		00
5000-5500	|	01
		50

iii. (a) Number of households whose monthly expenditure on food is less than ₹ 2000
= 20 + 13 = 33
(b) Number of households whose monthly expenditure on food is more than ₹ 3000
= 2 + 1 + 2 + 0 + 1 = 6
(c) Number of households whose expenditure on food is between ₹ 1500 and ₹ 2500
= 13 + 6= 19

SHORT ANSWER/LONG ANSWER TYPE QUESTIONS

19. In a city 45 families were surveyed for the number of Cell phones they used. Prepare a frequency array based on their replies as recorded below.
1 3 2 2 2 2 1 2 1 2 2 3 3 3 3 3 3 2 3 2 2 6 1 6 2 1 5 1 5 3 2 4 2 7 4 2 4 3 4 2 0 3 1 4 3

Ans:

No. of domestic appliances	**No of households**
0	**1**
1	**7**
2	**15**
3	**12**
4	**5**
5	**2**
6	**2**
7	**1**
Total	**45**

20. From the following data, calculate the lower limit of the first class and upper limit of the last class.

Daily Wages	Less than 120	120−140	140−160	160−180	Above 180
No. of Workers	35	12	10	40	13

Ans: In the given question, the size of each class is 20. Thus, maintaining the uniformity, we take the first class as 100-120 and the last class as 180-200. Therefore, the lower limit of the first class-interval is 120 − 20 = 100 and the upper limit of the last class is 180 + 20 = 200.

21. Explain the 'exclusive' and 'inclusive' methods used in classification of data.

Ans:

Exclusive method: In this method, the classes are formed in such a way that the upper-class limit of one class becomes the lower-class limit of the next class. Under this method, the upper-class limit is excluded in the interval.

E.g. If the class intervals are 10-20, 20¬30 and so on, a value of 20 would be included in the 20-30 and not in the interval 10-20.

Inclusive method: In this method, values equal to the lower and upper limits of a class are included in the frequency of that same class. Both class limits are parts of the class interval, e.g., the class intervals of 0-5, 6-10, 11-15 are inclusive.

22. Define Classification of Data. Bring out the difference between Qualitative & Quantitative classification of data.

Ans: Classification is the grouping of related facts into different classes. Thus, the process by which data is divided into different classes on the basis of some common characteristics is called Classification of Data.

Qualitative Classification: When the data is classified according to the qualities or attributes of data, it is called qualitative classification. Qualitative classification maybe of two types:

a) Simple Classification: the data are divided on the basis of existence or absence of a quality.

b) Manifold Classification: the quality of data involves more than one characteristic. Example: Data classified on the basis of Education, Occupation, Religion etc.

Quantitative Classification: Quantitative or numerical classification is done on the basis of numerical values of the facts. A number of classes are framed keeping in view the lowest and highest value as well as the range of values in the data. Example: Data classified on the basis of profit levels, wages earned, marks secured etc.

23. The marks obtained by 25 students in statistics in a class are as follows: Prepare a frequency distribution by inclusive method.

22 28 30 32 35 37 40 41 43 44 45 45 48 49 52 53 54 56 56
58 60 62 65 68 69

Ans:

Class interval	Tally mark	Frequency
20-29	||	2
30-39	||||	4
40-49	|||| |||	8
50-59	|||| |	6
60-69	||||	5
Total		25

24. Students of class obtained following marks in Mathematics. Convert the data of inclusive series into exclusive series.

Marks	5-9	10-14	15-19	20-24	25-29
Frequency	3	5	10	4	2

Ans:

Conversion of Inclusive series into Exclusive series: Inclusive series are used when there is some definite difference between the values of various items in the population. Following steps are involved in the conversion of an inclusive series into an exclusive series.

(j) First, we find the difference between the upper limit of class interval and the lower limit of next class interval.

(ii) Half of that difference is added to the upper limit of a class interval and half is subtracted from the lower limit of the class interval.

Marks	4.5-9.5	9.5-14.5	14.5-19.5	19.5-24.5	24.5-29.5
Frequency	3	5	10	4	2

25. Convert the following 'more than' cumulative frequency distribution into a 'less than' cumulative frequency distribution

Class-Interval (More than)	10	20	30	40	50	60	70	80
Frequency	124	119	107	84	55	31	12	2

Ans: The 'more than' cumulative frequency distribution can be presented in the form of a 'simple frequency distribution' as follows.

Class-Interval	Frequency
10-20	124 − 119 = 5
20 - 30	119 − 107 = 12
30 - 40	107 – 84 = 23
40 - 50	84 – 55 = 29
50 - 60	55 – 31 = 24
60 - 70	31 − 12 = 19
70 - 80	12 − 2 = 10
80 - 90	2

From the above distribution, we can make the 'less than' cumulative frequency distribution as follows.

Class-Interval	**Frequency**
Less than 20	5
Less than 30	5 + 12 = 17
Less than 40	17 + 23 = 40
Less than 50	40 +29 = 69
Less than 60	69 + 24 = 93
Less than 70	93 + 19 = 112
Less than 80	112 + 10 = 122
Less than 90	122 + 2 = 124

MIND MAPPING OF PRESENTATION OF DATA

Presentation of Data

1. Tabular presentation of data
2. Diagrammatic presentation of data

3. **Meaning of tabular presentation of data:** A statistical table is the systematic organization of data in columns and rows.
4. **Parts of Table:** Table number, Title, Caption, Stubs, Body of the table, Head note, Foot note and Source note.

Diagrammatic Presentation:

i) Geometric from

1. Bar diagram and its Types
2. Pie diagram

Graphic Presentation of Data:

ii) Frequency

1. Histogram
2. Polygon
3. Ogive

Ogive: It is a curve which is constructing by platting cumulative frequency data on the graph paper, in the form of a smooth curve.

1. Less than method
2. More than method

Histogram:

1. **Histogram of equal class interval:** These are those which are based on the data with equal class intervals.
2. **Histogram of unequal class interval:** It is the one based on the data with unequal class intervals

Polygon: Polygon is a diagrammatic presentation of data which is constructed by joining the mid-point of the top of all rectangles in a histogram.

1. Frequency polygon
2. Frequency Curve.

PRESENTATION OF DATA

Presentation Data: The data are presented inform of table and diagrammatic is called as presentation of data.

Forms of Presentation of Data

1. Tabular presentation
2. Diagrammatic presentation

Tabular Presentation: A statistical table is the systematic organization of data in columns and rows. Tabular involves the orderly and systematic presentation of numerical data in a form designed for the problem under consideration.

Components of Table: Following are the principle components of a table:

1. **Table Number:** First of all, a table must be numbered. Different tables must have different numbers. Eg: 1,2,3 and so on etc. These numbers must be in the same order have the tables. Numbers facilitates location of the table.
2. **Title:** A table must have a title. Title must be returned in bold letters. It should attract the attention of the readers. The title must be simple, clear and short. A good title is short but complete in all respects.
3. **Head Note:** If the title of the table does not give complete information, it is supplemented with a head note. It completes the information in the title of the table. Eg: lakhs, KG, Rs. etc.
4. **Stubs:** Stubs are titles of the rows of a table. These titles indicate information contained in the rows of a table.
5. **Caption:** It is the title given to the columns of the table. It indicates information contained in the column of a table. Eg: students may be classified into boys and girls as sub-heads.
6. **Body or field:** Body of a table means sum total of the items in the table. Thus, body is the most important part of a table. It indicates values of the various items in the table. Each item in the body is called cell.
7. **Foot notes:** Foot notes are given for clarification of the reader. These are given when information in the table need to be supplemented.
8. **Source Note:** The source note shows the source of data from where the data are borrowed like publishers, journals, newspaper etc.

Objectives of Tabulation

1. They simplify complex data and the data presented are easily understood.
2. They facilitate comparison due to proper systematic arrangement of statistical data in different columns.
3. They leave a lasting impression without any confusion.
4. They facilitate computation of different statistical measures namely average, dispersion, correlation etc.
5. Tabulated data are good for references & they make it easy to present information on graphs & diagrams.

Kinds of Table

1. **Simple or one-way table:** A simple table is that table which shows only one feature of the data.
2. **Complex table:** A complex table is one which shows more than one feature of data.
3. **Double or two-way table:** A two-way table is that which shows two features of the data.
4. **Treble Table:** It is that table in which three features of data are present. Eg: table shows no. of students in a college according to class, gender and habitation.
5. **Manifold Table:** It is a one which shows more than three characteristics/ features of the data. Eg: No. of student in a college according to their gender, class, habitation and marital status.

Illustration 1. In a sample study about coffee drinking habits in two towns, the following information was received:

Town A: Females were 40%, Total coffee drinkers were 45% and Males non-coffee drinkers were 20%.

Town B: Males were 55%, Males non-coffee drinkers were 30% and Females coffee drinkers were 15%.

Represent the above data in a tabular form.

Illustration 2: Of the 1,125 students studying in a school during 2005-2006, 720 are Hindus, 628 are boys and 440 are science students. The number of Hindu boys is 392, that of boys studying science 205 and that of

Hindu students studying science 262, finally, the number of science students among the Hindu boys was 148. Enter these frequencies in a table and complete the table by obtaining the frequencies of the remaining cells.

Illustration 3: Census of India 2001 reported that Indian population had risen to 102 crores of which only 49 crores were females against 53 crore. 74 crore people resided in rural India and only 28 crores lived in towns or cities. While there were 62 crore non-workers Population against 40 crore workers in the entire country, urban population had an even higher share of non-workers (19 crore) against the workers (9 crore) as compare to the rural population where there were 31 crore workers out of 74 crore population.

FORMAT OF TABLE

Table Number: …….

Title: …….

[Head note]

Stub	Caption				Total [Rows]
	Sub-head				
	Column Head	Column Head	Column Head	Column Head	
Stub entries	←	BODY ↑ ↓	→		
Total [columns]					

Source Note:

Foot Note :

Diagrammatic Presentation of Data

Utility or uses of diagrammatic presentation:

1. Makes complex data simple.
2. Diagrams are attractive.
3. Diagrams save time when compared to other methods.
4. Diagrams create a lasting impression on the minds of observers.

Limitations of diagrammatic presentation:

1. They do not provide detailed information.
2. Diagrams can be easily misinterpreted.
3. Diagrams can take much time and labor.
4. Exact measurement is not possible in diagrams.

Kinds of diagrams:

1. Line diagrams – Lines are drawn vertically to show large number of items.
2. Bar diagram – Is one dimensional diagram. It comprises of a group of rectangular bars having equal space and width for each class of data.
3. Pie diagrams– It is circle sub-divided into segment to present data proportionately.

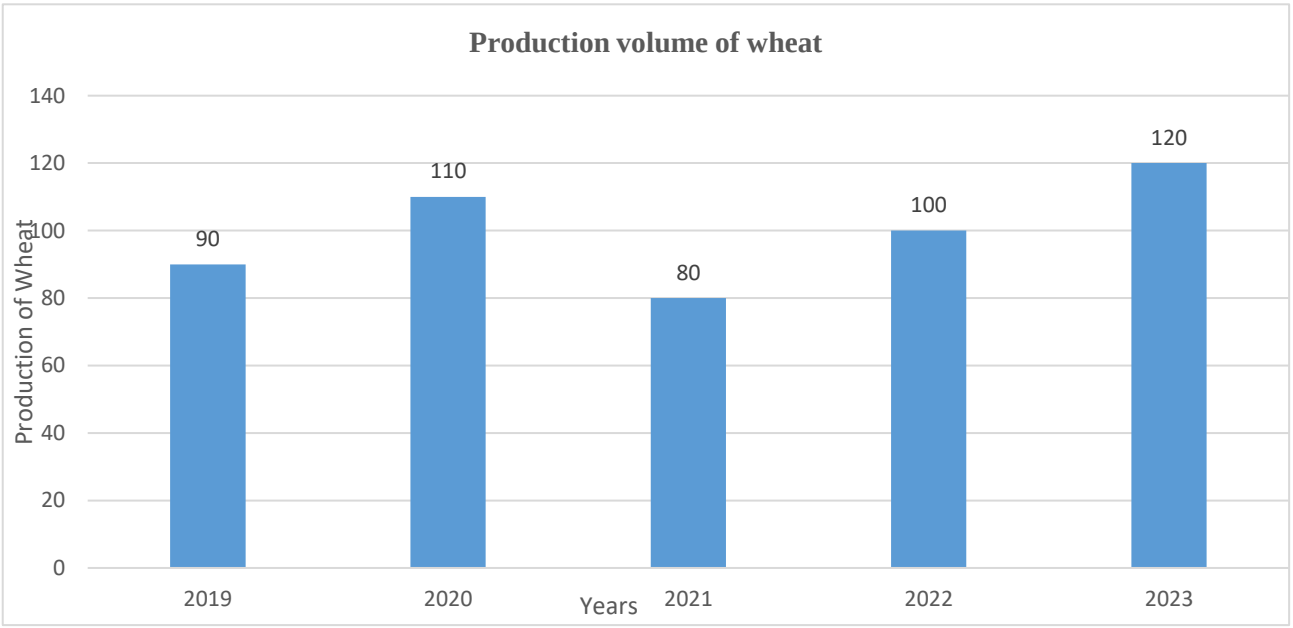
Bar diagram

1. **Simple Bar Diagram:** These are those diagrams which are based on a single set of numerical data. There are two types of simple bar diagrams: **Vertical Bar Diagram, Horizontal Bar Diagram**

Ex: Draw a simple bar diagram for the data obtained for on the production volume of wheat during rabi reason from the financial year 2020 to 2023 from the given data.

Production volume of wheat

Year	2019	2020	2021	2022	2023
Production of wheat (tone's)	90	107	109	107	112

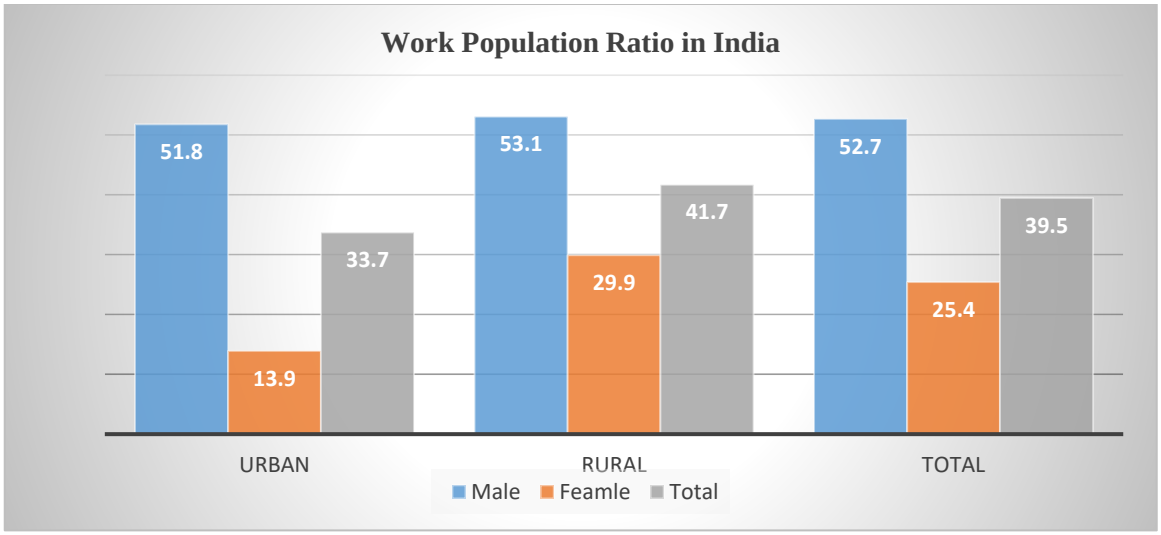


2. **Multiple Bar diagrams** – These diagrams represent more than one type of data at a time.

Ex: Draw a multiple bar diagram for the data obtained for on the work population ratio in India from given following data.

Work Population Ratio in India

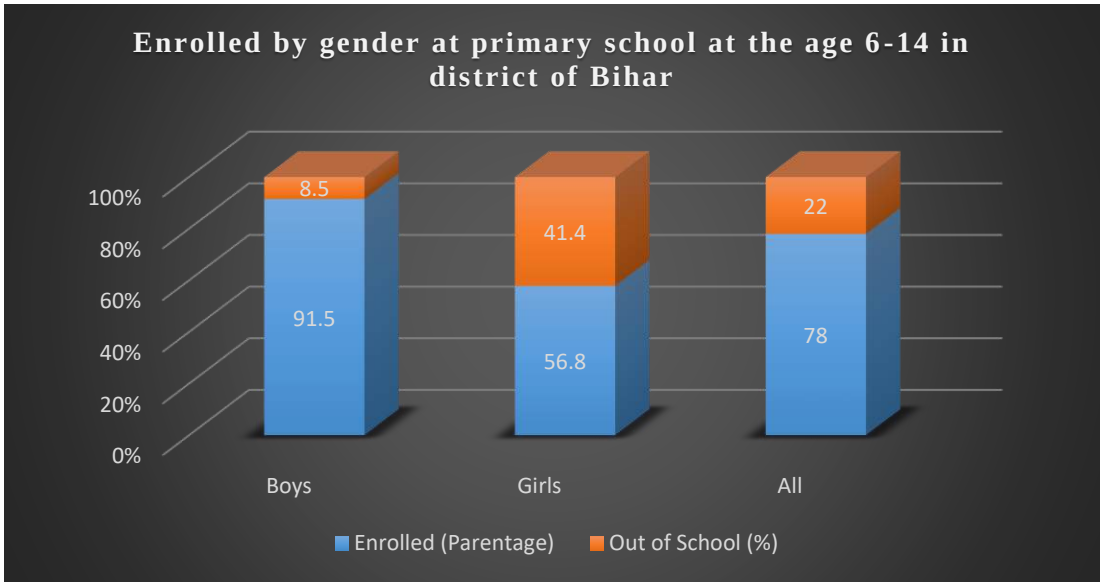
Sex	Urban	Rural	Total
Male	58.1	53.1	52.7
Female	13.9	29.9	25.4
Total	33.7	41.7	39.5



3. **Subdivided Bar diagram or Component Bar diagram** – These diagrams present total values and parts in a set of a data.

Ex: Enrolment by gender at schools (per cent) of children aged 6–14 years in a district of Bihar.

Gender	Enrolled (Parentage)	Out of School (Percentage)
Boys	91.5	8.5
Girls	56.8	41.4
All	78	22

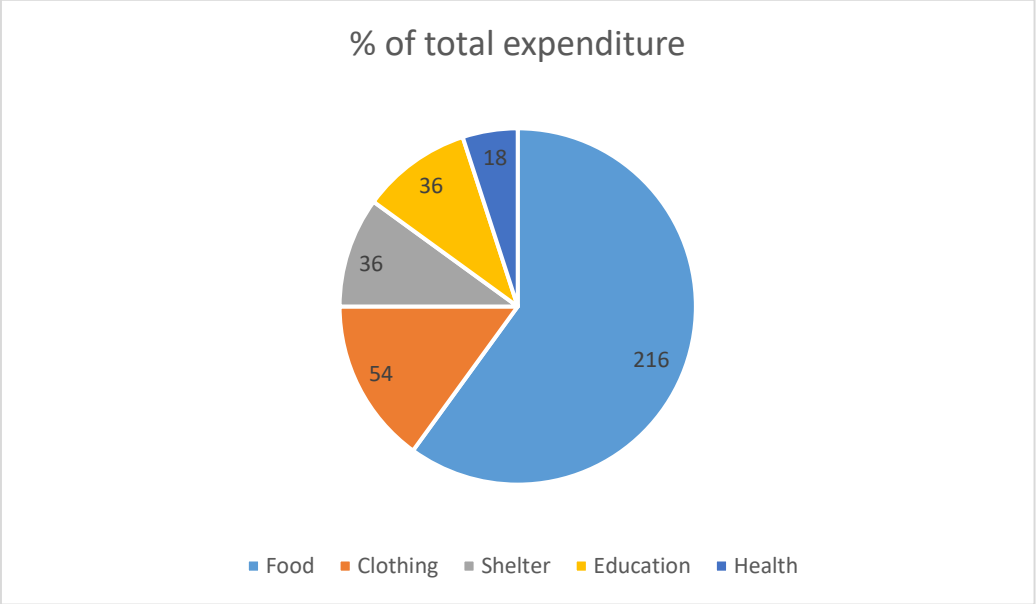


Pie diagrams – Circle may be divided into various sectors representing various components.

Angle= value of individual item divided by Sum of total item multiplied with 360^0

Ex: Make a pie chart from the following given data.

Item of expenditure	% of total expenditure	Agular component
Food	60	60x3.6=216
Clothing	15	15x3.6=54
Shelter	10	10x3.6=36
Education	10	10x3.6=36
Health	5	5x3.6=18



GRAPHIC PRESENTATION OF DATA

Meaning: It is a sort of chart which shows statistical data in the form of lines or curves.

Advantages of Graphic Presentation:

1. Graphs represent complex data in a simple form.
2. Values of median, mode can be found through graphs.
3. Graphs create long lasting effect on people's mind.

Disadvantages of graphic Presentation:

1. Graphs do not show precise values.
2. Only experts can interpret graphs.
3. Graphs may suggest wrong conclusions.

Rules of Constructing graph:

1. The heading of the graph should be simple, clear and self-explanatory.
2. Graphs should always be drawn with reference to some scale.
3. False baselines should be drawn if the difference between zero and the smallest value is high.
4. Index should be made if different lines are drawn as in time series graphs.

Types of Graphs:

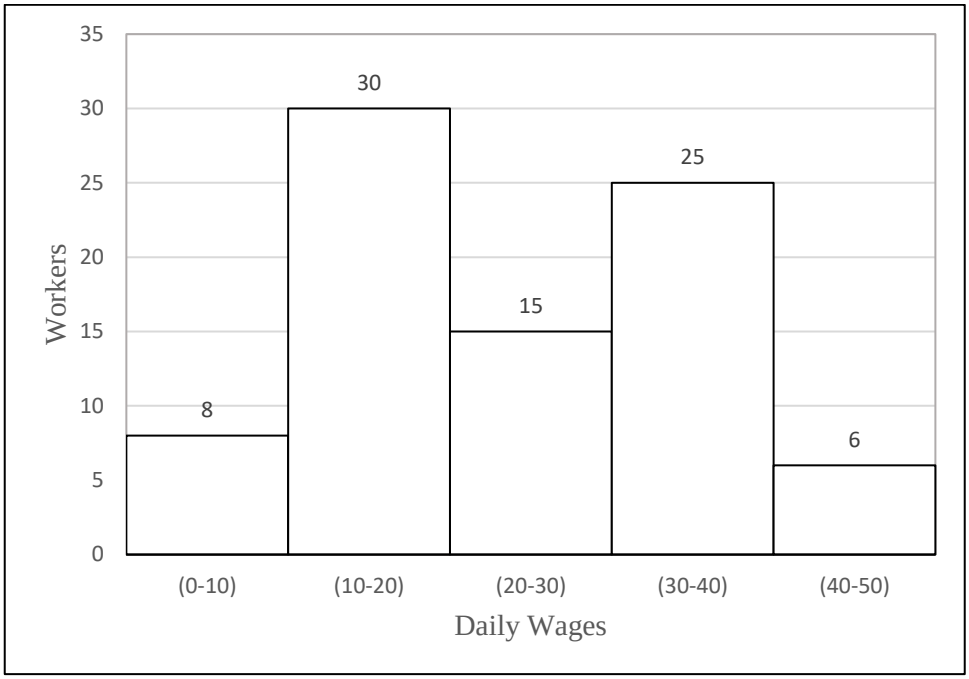
1. Line frequency graphs – Such graphs are used to represent discrete series.
2. Histogram – A two-dimensional diagram whose length shows frequency and the breadth shows size of class interval.

   Histogram: It is a graphical presentation of a frequency distribution of a continuous series. If data are given in inclusive form, these are first converted into exclusive form for constructing a histogram. Histogram of frequency distribution are of two types:

   Histogram of equal class interval: These are those which are based on the data with equal class intervals.

   Ex: Represent the following given data by equal class intervals of histogram.

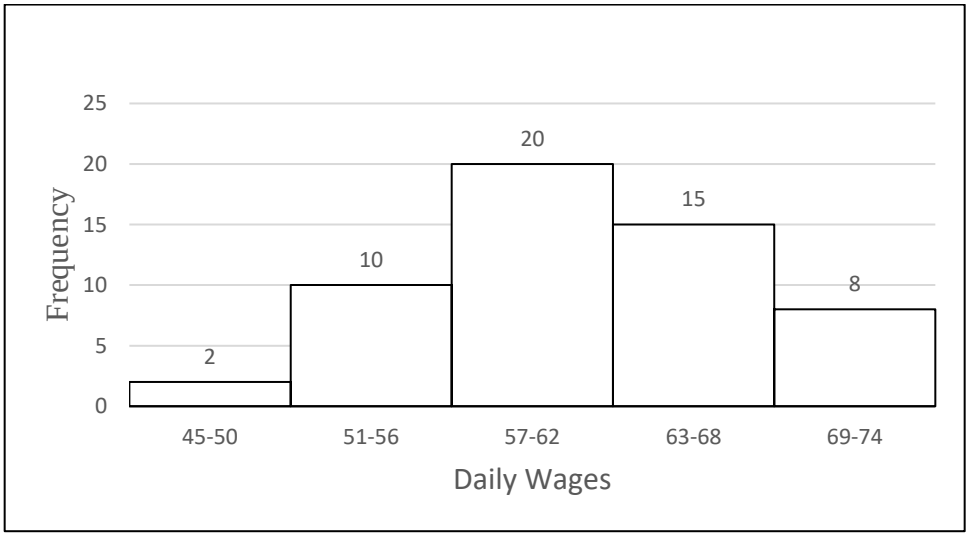
Daily Wages	Workers
(0-10)	8
(10-20)	30
(20-30)	15
(30-40)	25
(40-50)	6



Histogram of unequal class interval: It is the one based on the data with unequal class intervals. Before presenting the data in the form of graphs, frequencies of unequal class interval are adjusted.

Represent the following given data by unequal class intervals of histogram.

Daily wages (Rs)	Number of Workers (f)
45-50	2
51-56	10
57-62	20
63-68	15
69-74	8



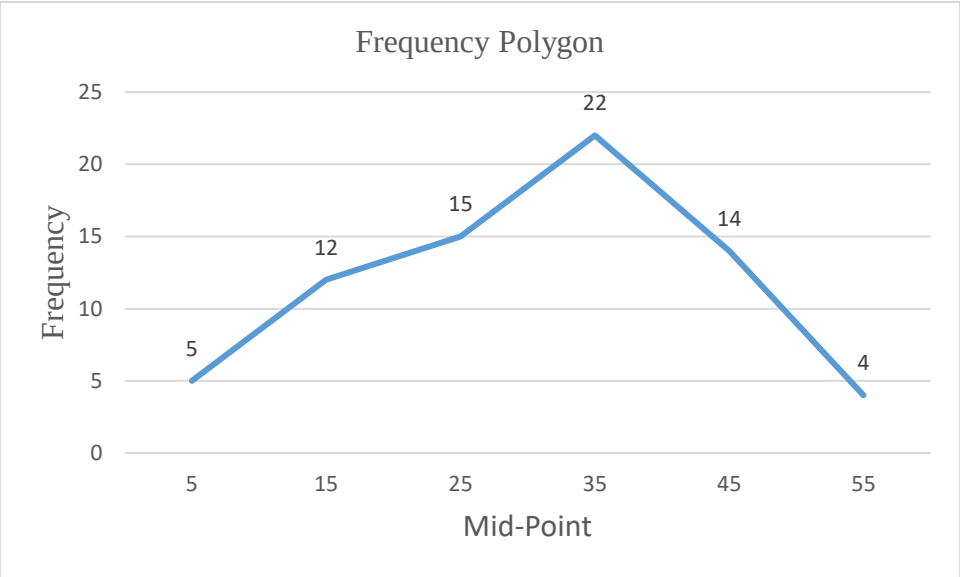
Polygon: Polygon is a diagrammatic presentation of data which is constructed by joining the mid-point of the top of all rectangles in a histogram. However, a polygon can be drawn even without constructing a histogram. For this, mid values of the classes of a frequency distribution are marked on X-axis of the graph and corresponding frequencies are marked on the Y-axis. All points indicating frequencies of the different classes are joined to make a graph called frequency polygon.

Frequency Polygon: A histogram becomes frequency polygon when a line is drawn joining midpoints of tops of all rectangles in a histogram.

Ex: Represent frequency polygon from the given following data.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of Students	5	12	15	22	14	4

Marks	Mid-Point	Frequency (f)
0-10	5	5
10-20	15	12
20-30	25	15
30-40	35	22
40-50	45	14
50-60	55	4



Frequency Curve: Smooth curve joining the points corresponding to the frequency and provides frequency curve of the data.

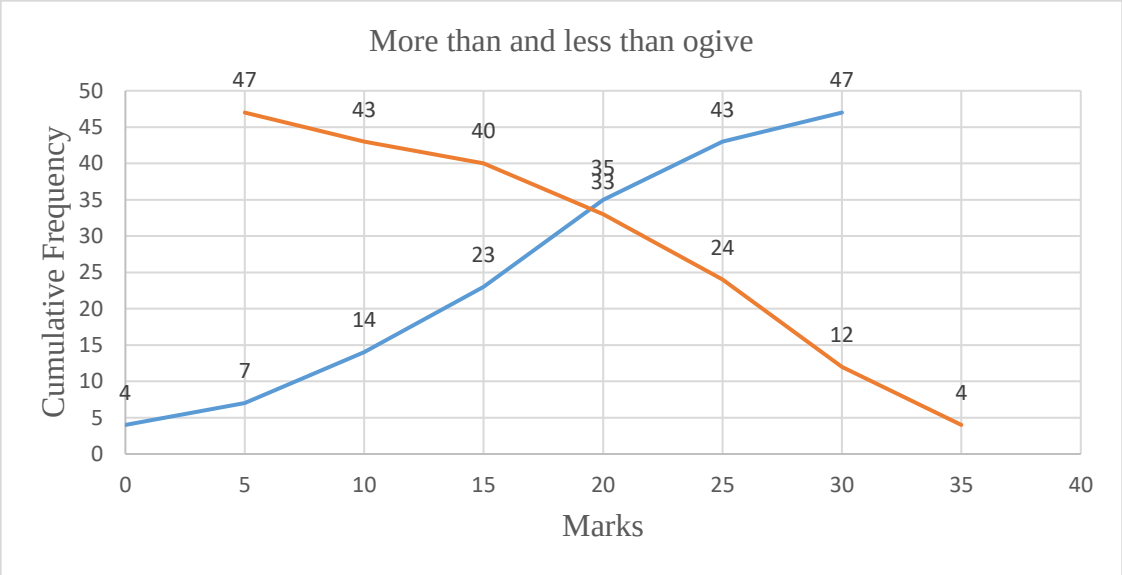
Ogive: A curve obtained by plotting frequency data on the graph paper.

Ogive or Cumulative Frequency Curve: It is a curve which is constructing by platting cumulative frequency data on the graph paper, in the form of a smooth curve. It is constructed in two ways:

1. **Less than method:** In this method, beginning from upper limit of class interval we go on adding the frequency corresponding to every next upper limit of the series.

2. **More than method:** In this method, we take cumulative total of the frequencies beginning with lower limit of the first-class interval.

Class	Workers	More than ogive	CF	less than ogive	CF	More than ogive
(0-5)	4	0	4	5	47	0
(5-10)	3	5	7	10	43	5
(10-20)	7	10	14	15	40	10
(15-20)	9	15	23	20	33	15
(20-25)	12	20	35	25	24	20
(25-30)	8	25	43	30	12	25
(30-35)	4	30	47	35	4	30



Importance and uses of Graphs and Diagrams.

1. **They are interesting, attractive and impressive:** One can study the trend and fluctuations of the statistical values by graphic presentation. A layman who is not interested in going through the figures, gets message from graphs and diagrams. Diagrams are used for publicity and propaganda.
2. **They are the simplest methods of presenting data:** They save time and energy of the statistician and the layman. One can understand the figures what they want to say without any strain on mind and knowledge of mathematics as they mark the data simple and intelligible.
3. **They make comparison easy:** Comparison from one period to another period or from one section to another section becomes easy. Thus, diagrams can be used for quick comparisons.
4. **They have universal utility:** Since the figures are made very attractive by the presentation of graphs and diagrams, they are popularly used in exhibitions, fairs, journals, newspapers, board meeting etc. Diagrams are used particularly to give information to the common man. They are widely used in economic, social, business and other fields. Diagrams play an important role in the modern advertising campaigns.
5. **Graphs are used for finding positional values:** Diagrams are not used for statistical determination of values but special type of graphs help for finding positional values like median, quartiles, mode etc.

Arithmetic Line Graph

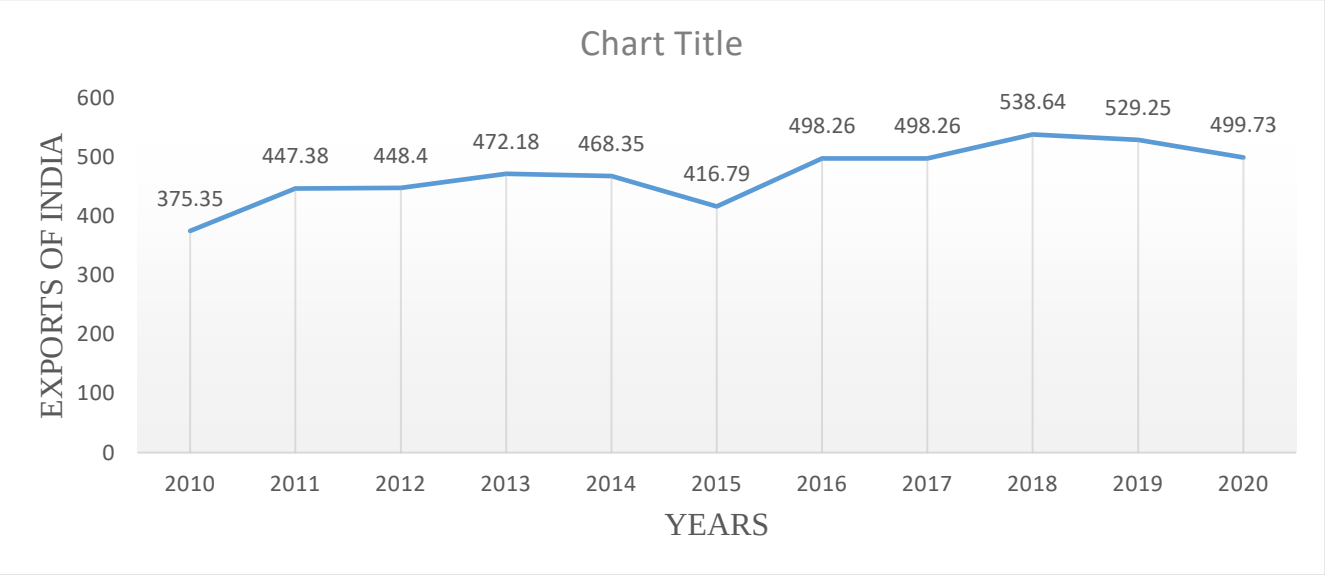
Meaning: Arithmetic line graphs are constructed to present time series data, that is, the data corresponding to different weeks, months or years. Therefore, arithmetic-line graphs are often called 'time series graphs'.

Step to construct Arithmetic line graph

Step 1: Since "time" is an independent variable, show it along the X-axis in the graph. The other variable is measured along the Y-axis because it is a dependent variable.
Step 2: Place a point on the graph for each pair of values that represents the independent variable's value on the X-axis and the dependent variable's value on the Y-axis.
Step 3: To create the time series graph, straight lines (not freehand lines) are used to connect all the data points that so obtained.

Ex: Represent the Arithmetic line graph from the following given data.

Years	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Export in (Dollars)	375.35	447.38	448.40	472.18	468.35	416.79	498.26	498.26	538.64	529.25	499.7



MULTIPLE CHOICE QUESTIONS

1. Arithmetic line graphs are also known as
   (a) Linear graph
   (b) Time series graph
   (c) Non-linear graph
   (d) Ogive
2. Median of a distribution can be obtained from
   (a) Ogive
   (b) Histogram
   (c)Pie diagram
   (e) Bar graph
3. Tabulation is, arranging data in
   (a) Rows and graph
   (b) Rows and columns
   (c) Rows and diagrams
   (d) Diagrams and graphs

4. Histogram is a graphical representation of a frequency distribution of a
   (a) Individual series
   (b) Discrete series
   (c) Continuous series
   (d) Linear graph

5. Captions is the title given to:
   (a) Columns
   (b) Rows
   (c) Head note
   (d) Stubs

6. Which of the following refer to geometric form of data presentation?
   (a) Bar diagram
   (b) Histogram
   (c) Pie diagram
   (d) All of the above
7. What will be the degree measure of an angle in the pie diagram if a household spends 80% of his income on goods?
   (a) 180°
   (b) 228°
   (c) 90◦
   (c) 72°
8. The most attractive method of data presentation:
   (a) Textual
   (b) Tabular
   (c) Diagrammatic
   (d) Either (a) or (b)

9. Data represented through arithmetic line graph help in understanding
   (a) Long term trend
   (b) Cyclicity in data
   (c) Seasonality in data
   (d) All the above
10. Data represented through a histogram can help in finding graphically the
   (a) Mean
   (b) Mode
   (c) Median
   (d) All of the above
11. Which diagram is never drawn for a discrete variable?
   (a) Histogram
   (b) Frequency polygon
   (c) Frequency curve
   (d) Ogive
12. Which of the following frequency diagram uses cumulative frequency distribution?
   (a) Bar diagram
   (b) Frequency curve
   (c) Histogram
   (d) Ogive

Read the following statements carefully: In the light of the given statements, choose the correct alternative from the following:
(a) Statement 1 is true and statement 2 is false
(b) Statement 1 is false and statement 2 is true
(c) Both statements 1 and 2 are true
(d) Both statements 1 and 2 are false

13. Statement 1: In textual presentation, data are described within the numerical.
    Statement 2: Under textual presentation large size of data to be presentation as a part of text.
14. Statement 1: Captions is the title given to the rows of a table.
    Statement 2: Footnotes are given for clarification of the reader.
15. Statement 1: Data representation through histogram can help in understanding the trend
    Statement 2: "More than ogive" is drawn on the basis of upper limit and increasing frequency

Read the following statement -Assertion (A) and Reason (R). Choose one of the correct alternatives given below:
Alternatives:
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.

16. Assertion (A): Frequency polygon is the most common method of presenting grouped frequency distribution.
    Reason (R): -Frequency polygon is derived from histogram.
17. Assertion (A): - Table is the Consequence of tabulation
    Reason (R): Tabulation is systematic and logical presentation of numeric Data in row and columns.
18. Assertion: The heading given to a column in a table is called caption
    Reason: Body of the table contains numerical information.

Answers:

1. Time series graph
2. Ogive
3. Rows and columns
4. Continuous series
5. Columns
6. All of the above
7. 228°
8. Diagrammatic
9. Long term trend
10. Mode
11. Histogram
12. Ogive
13. Both the statements are false
14. Statement 1 is false and statement 2 is true
15. Statement 1 is true and statement 2 is false
16. Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).

17. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
18. Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).

SHORT ANSWER/LONG ANSWER TYPE QUESTIONS

19. What kind of diagrams are more effective in representing the following:
    i. Monthly rainfall in a year
    ii.Composition of the population of Delhi by religion
    iii.Components of cost in a factory
    Ans:
    i. Arithmetic line graph
    ii. component bar diagram
    iii.Pie diagram

20. Explain the General rules for constructing Diagrams and graphs General rules for constructing Diagrams and graphs
    (i) Proper axis: Equal distances on the X and Y axis.
    (ii) Proper heading: The graph should be given a proper heading, suitable to the nature of information to be plotted through time series graph.
    (iii) Proper scale: appropriate scale fixed on which data should be presented.
    (iv) Use of signs or colors: If more than one line is to be drawn in the same graph, these signs or lines or colors should be differentiated from each other.
    *To draw a line: The various pointes so obtained are joined by straight lines.
    *Less use of words and figures: Plot each value of graph by point. Less use of words and figures.

21. Explain advantages and disadvantages of textual presentation of data.
    Ans: **Advantages**
    - the reporter can draw attention of the reader to highlight particular points which he considers to be of special importance
    - this mode of presentation of data is easy to understand as well as appealing to literate people.
    - Detailed information can be provided to the reader regarding any problem.

    Disadvantages
    - In most cases, the textual presentation of statistical information is monotonous and boring.
    - It is not appropriate for presenting a large volume of statistical information.
    - If it becomes necessary to make large number of comparisons, this method may not work.

22.Write three merits of tabular presentation of data.
    (a) It plays an important role in simplifying presentation of data.
    (b) It facilitates further analysis.
    (c) Tables are good sources of reference for further studies.
    (d) Tables facilitate comparison.

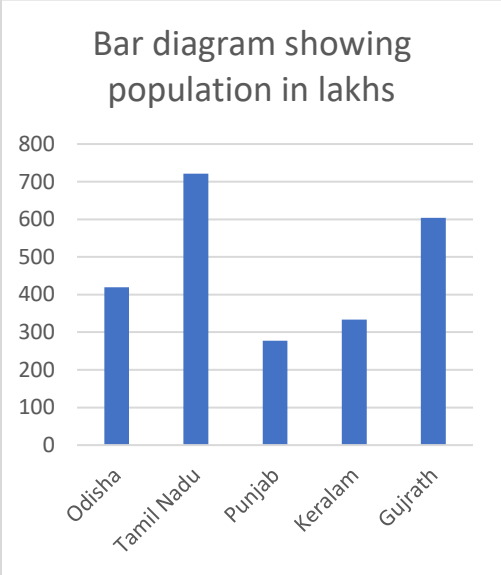
23. Distinguish between a bar diagram and a histogram.

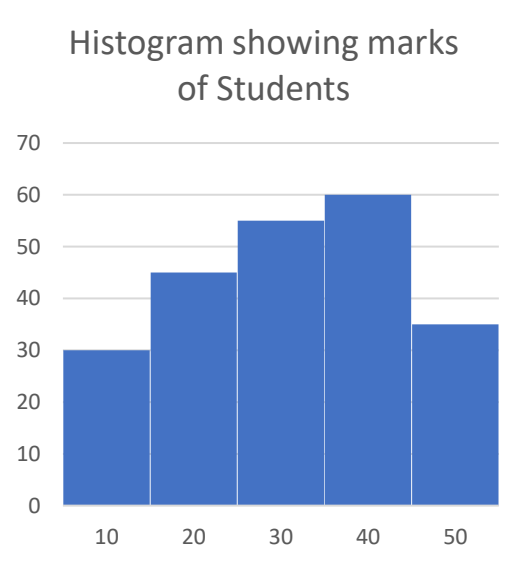
Ans. Bar diagram is different from a histogram in two ways:

(a) In a bar diagram, we are concerned with the length of the bar. They are one-dimensional form of presentation. But a histogram is a two-dimensional form of presentation where length and width both are considered.

(b) In a bar diagram, there is a gap between different bars whereas in a histogram, there is no gap in between the different rectangles.

The following figures illustrate the idea:

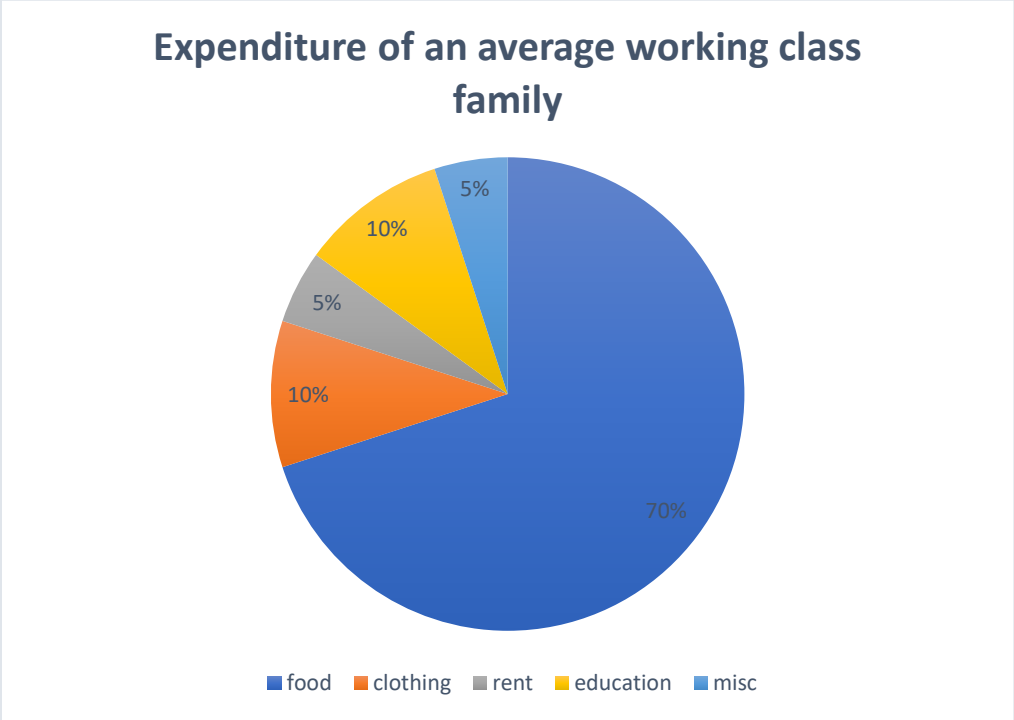




24. Represent the following using pie diagram

Items of expenditure	% of total exp	Proportionate angles
food	70	70x3.6 =252°
clothing	10	10x3.6 =36°
rent	5	5x3.6=18°
education	10	10x3.6 =36°
miscellaneous	5	5x3.6=18°

Ans:



25. What are the essential parts of a statistical table? Explain any four.

Ans: Tabular Presentation: A statistical table is the systematic organization of data in columns and rows. Tabular involves the orderly and systematic presentation of numerical data in a form designed for the problem under consideration.

1. Table number
2. Title
3. Caption or Column head
4. Stub or Row head
5. Body of the table
6. Source note
7. Foot note

Table Number: First of all, a table must be numbered. Different tables must have different numbers. If in a chapter more than one table is presented then it is essential to number them like 2.1,2.2 etc. It is given at the top of the table.

Title: A table must have a title. It should attract the attention of the readers. The title must be simple, clear and short. A good title is short but complete in all respects.

Stubs: Stubs are titles of the rows of a table. These titles indicate information contained in the rows of a table.

Caption: It is the title given to the columns of the table. It indicates information contained in the column of a table. E.g: students may be classified into boys and girls as sub-heads.

UNIT 3: STATSTICAL TOOLS AND INTERPRETATION

MEASURES OF CENTRAL TENDENCY

A measure of central tendency is a value that represents the entire group of data.

Important Term and Concepts:

Average: 'An average is a figure that represents the whole group'.

Averages are also called Measures of Central Tendency.

Functions of Average:

i] Presents complex data in a simple form.

ii] Facilitates comparison.

iii] Helps government to form policies.

iv] Useful in Economic analysis.

Essentials of a good Average:

i. Simple to calculate.

ii. It should be easy to understand.

iii. Rigidly defined.

iv. Based on all items of observation.

v. Least affected by extreme values.

vi. Capable of further algebraic treatment.

vii. Least affected by sampling fluctuation.

viii. Graphic measurement possible.

The measures of central tendency are

a) Mean (X)

b) Median (M)

c) Mode (Z)

ARITHMETIC MEAN

Arithmetic mean of series of items is obtained by adding values of the items and dividing by the numbers of items.

It is the most common type of measures of central tendency.

Types of Arithmetic Mean:-

(1) Simple Arithmetic mean: - In it, all items of a series are given equal importance.

(2) Weighted Arithmetic mean: - Deferent items of a series are accorded different weightsin accordance with their relative importance.

It is obtained by dividing the sum of all observation in a series by the total number of observations.

Merits of Arithmetic mean

1. Easy to calculate
2. Simple to understand .
3. Based on all observations
4. Easy mathematical calculations.

Demerits of Arithmetic Mean:

1. Affected by extreme values.
2. Cannot be calculated in open-end series.
3. Cannot be graphically ascertained
4. Sometimes misleading or absurd result.

Weighted Arithmetic Mean:

Values to be arranged are given varying importance.

$$XW = \frac{\sum WX}{\sum W}$$

Where Xw = Weighted Arithmetic Mean

W = Weight, X = Values of the variables

Calculation of Arithmetic Mean:

	Individual Series	Discrete Series	Continuous Series
Direct Method	$X = \frac{\sum X}{N}$	$X = \frac{\sum fx}{N}$	$X = \frac{\sum fx}{\sum f}$
Assumed Mean Method	$X = A + \frac{\sum X}{N}$	$X = A + \frac{\sum fdx}{N}$	$X = A + \frac{\sum fd}{\sum f}$
Step Deviation Method	$X = A + \frac{\sum d'}{N} \times i$	$X = A + \frac{\sum fdx}{N} \times i$	$X = A + \frac{\sum fd'}{\sum f} \times i$

Individual series

Direct Method: - Marks of 10 students is 10,15, 12, 11,20,16,22,25,30 and 35.Find out the average marks.

Solution: - $X = \sum X / N$

Marks	10	15	12	11	20	16	22	25	30	39	$\sum X$ = 200

$X = \sum X / N = 200 / 10 = 20$

Assumed Mean Method: -

No.of students	Marks	AM (d=X-A)
1	10	-12
2	15	-7
3	12	-10
4	11	-11
5	20	-2
6	16	-6
7	22 (A)	0
8	25	3
9	30	8
10	39	17
N=10		∑d = - 48+28= -20

Solution: X = A + ∑d / N Mean = 22+ (-) 20/10 = 20

DISCRETE SERIES

Marks	**10**	**20**	**30**	**40**	**50**
No of Students	**15**	**10**	**40**	**20**	**15**

Solution

Marks	**Students**	**Discrete Method**	**Short-cut method**		**Step- devotion method**	
X	**F**	**Fx**	**X-A=d(30)**	**fd**	**d/c=d'**	**fd'**
10	**15**	**150**	**-20**	**-300**	**-2**	**-30**
20	**10**	**200**	**-10**	**-100**	**-1**	**-10**
30	**40**	**1200**	**0**	**0**	**0**	**0**
40	**20**	**800**	**10**	**200**	**1**	**20**
50	**15**	**750**	**20**	**300**	**2**	**30**
	∑f=100	∑fX=3100		∑fd=100		∑fd'=10

Discrete Method: - X = ∑fX / ∑f = 3100/100 = 31

Short-cut Method: - X= A + ∑fd / ∑f = 30+100 / 100 = 31

Step- deviation method: X= ∑fd'/ ∑f x i = 30+10/ 100 x 10 =31

CONTINUOUS SERIES

Marks	0 - 4	4 – 8	8 - 12	12-16	16 - 20
No of Students	4	8	2	1	5

Solution

Marks	Students	Mid-point	Discrete Method	Short-cut method		Step- deviation method	
C.I	F	M	fm	d = m-A(5)	fd	d/c=d’	fd’
0-2	5	1	5	-4	-20	-2	- 10
2-4	15	3	45	-2	-30	-1	- 15
4-6	10	5	50	0	0	0	0
6-8	10	7	70	2	20	1	10
8-10	10	9	90	4	40	2	20
	∑f=50		∑fm=260		∑fd=-10		∑fd’= 5

Direct Method: - **X =** $\sum fm / \sum f$ = 260/ 50 = 5.2

Short-cut method: - **X= A +** $\sum fd / \sum f$ = 5+ (-) 10 / 50 = 5.2

Step- deviation method: **X= A+** $\sum fd' / \sum f \times i$ = 5+ 5 / 50 x 4 =5.2

==========

MEDIAN

It is defined as the middle value of the series, when the data is arranged in ascending or descending order.

Calculation of Median for Individual & Discrete Series

$$M = \text{Size of } \frac{(N+1)}{2}^{th} \text{ item}$$

Individual series

The following series show Marks of 9 students. Find the median marks.

Marks	17	32	35	33	15	21	41	18	11

Solution:

Ascending order			**Descending order**	
1	**11**		**1**	**35**
2	**15**		**2**	**33**
3	**17**		**3**	**32**
4	**18**		**4**	**21**
5	**19A**		**5**	**19 A**
6	**21**		**6**	**18**
7	**32**		**7**	**17**
8	**33**		**8**	**15**
9	**35**		**9**	**11**
N=9			**N=9**	

M= Size of (N+1 / 2) th item

= Size of (9+1 / 2)th item

Size of 5th item = 19

The following series show Marks of 8 students. Find the median marks.

Marks	8	10	12	14	18	19	21	22

M= Size of (N+1 / 2) th item

= Size of (8+1 / 2) th item

Size of 4.5th items

Size of 4th item + Size of 5th items / 2 = 14+18 / 2= 16

Median marks= 16 marks

DISCRETE SERIES

Calculate median from following set of data:

Size 'X'	5	6	7	8	9
Frequency(f)	4	1	3	7	4

Solution

Size 'X'	**Frequency(f)**	**CF**
5	**4**	**4**
6	**1**	**5**
7	**3**	**8**
8	**8**	**16**
9	**4**	**20**

M= Size of (N+1 / 2) th item

N = ∑f

= Size of (20+1 / 2) th item = size of 11^{th} item

Since 11^{th} item falls in cf 16 and the size against this cf is 8.

Therefore, median of this series is 8.

CONTINUOUS SERIES

Calculate median from following set of data:

Size 'X'	0-10	10- 20	20 -30	30-40	40 -50
Frequency(f)	3	4	2	7	10

Solution

Size 'X'	**Frequency(f)**	**Cf**
0-10	**3**	**3**
10 -20	**4**	**7**
20 -30	**2**	**9 cf**
30 -40 (median class)	**7 f**	**16**
40 -50	**10**	**26**
	N=∑f= 26	

Median Item = size of (N/2) th item. =26/2 =size of 13^{th}

item$M = L_1 + \frac{N/2 - c.f}{f} \times i$

= 30+ (13 – 9 / 7) x 10 = 35.71 **Median = 35.71**

Merits of Median

1. It is not affected by extreme values.
2. It is simple and easy to understand.
3. It can be presented graphically.
4. It is defined rigidly.

Demerits of Median

1. It is not based on all observations.
2. Lack of further algebraic treatment.
3. Affected by fluctuations in sampling
4. Time consuming in case of large number of observations.

MODE

The value of the variable which occurs most frequently in a distribution is called the mode.

Calculation of Mode

Individual Series:

a. By Inspection
b. By conversion into discrete series and then identify the value corresponding to which there is highest frequency.

(I) By Inspection: marks of 10 students, calculate the value of mode:

20, 22, 25, 28, 30, 32 ,35 ,25, 21, 25

Solution: arranging the series in ascending order: 20, 21, 22, 25, 25, 25, 28, 30, 30, 35

By inspection, marks 25 occurs the most, hence Mode (Z)is 25 marks.

(ii) By conversion into discrete series:

Marks (X)	20	21	22	25	28	30	35
Frequency	1	1	1	3	1	2	1

Discrete Series:

i. By Inspection Method.

ii Grouping Method: By preparing Grouping Table and then preparing Analysis table.

Calculate value of mode:

Marks	40	50	60	70	80	90
No of students	2	4	8	10	5	6

By Inspection Method: - By inspection, we find that 70 accurse most frequently,

Hence Mode marks = 70 marks.

Grouping Method:

Marks	F (column-I)	column-II (1+2)	column-III (2+3)	column-IV (1+2+3)	column-V (2+3+4)	column-VI (3+4+5)
40	2	2+4=6		2+4+8+14		
50	4		4+8=12		**4+8+10=22**	
60	8	**8+10=18**				**8+10+5=23**
70	**10**		**10+5=15**	**10+5+6=21**		
80	5	5+6=11				
90	6					

Since the value 70 has occurred for the maximum number of items, therefore the modal marks are 70.

Continuous Series:

(j) By Inspection Method.

(ii) Grouping Method

Calculate value of mode:

Marks	0-10	10-20	20-30	30-40	40-50
No of students	3	4	15	6	8

By Inspection Method: -

Marks (X)	No. of students(f)
0-10	3
10-20	**4 f0**
20-30	**15 f1**
30-40	**6 f2**
40-50	8

$$Z = L_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times i$$

Z= 20+ (15-4 / 2x 15- 4 -6) x 10 = 25.5

Mode = 25.5

Grouping Method:

Marks	**No. of students**
10-20	3
20-30	10
30-40	25
40-50	15
50-60	23
60-70	22
70-80	10
80-90	8

Grouping table

Marks	F (column-I)	column-II (1+2)	column-III (2+3)	column-IV (1+2+3)	column-V (2+3+4)	column-VI (3+4+5)
10-20	3	3+10=13		3+10+25=38		
20-30	10		10+25=35		10+25+15=50	
30-40	25	25+15=40				**25+15+23=63**
40-50	15		**15+23=38**	**15+23+22=60**		
50-60	**23**	**23+22=45**			**23+22+10=55**	
60-70	22		22+10=32			22+10+8=40
70-80	10	22+10=32				
80-90	8					

Mode class = 50-60 with frequency 23.

$$Z = L_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times i$$

Z = 50 + (23 -15 /2x 23 – 15 -22) x 10 = 58.9 mode (Z) = 58.9

Merits of Mode

i. It is easy to understand and simple to calculate.
ii. Not affected by extreme values.
iii. Can be located graphically.
iv. Easily calculated in case of open-end classes.

Demerits of Mode

i. Not rigidly defined.
ii. If mode is ill defined, mathematical calculation is complicated.
iii. Not based on all items.
iv. Not suited to algebraic treatment.

Relationship between Mean, Median and Mode

i. In case of symmetrical distribution

Mean = Median = Mode

ii. In case of asymmetrical distribution

Mode = 3 Median – 2 Mean

MULTIPLE CHOICE QUESTIONS

1……. is used when the sum of deviation from average should be least

a) Mean b) Mode c) Median d) None of these

2. Mean should be…….

a) Simple b) Based upon all items

c) Not capable of further algebraic d) All of these

3. Sum of deviation about mean is:

a) Zero b) Minimum

c) Maximum d) None of these

4. The most appropriate measure of central tendency in case of data of varying importance

a) Combined mean b) Weighted mean

c) Assumed mean d) All of these

5. The values of all items are taken into consideration in the calculation

a) Median b) Mode

(c) Mean d) None of these

5. The number of observations in a group is 50. If the average of first 20 is 5 and remaining 30 is 4, then the average of whole group is
   a) 4.1 b) 4 c) 4.2 d) 4.4

6. The value which has the greatest frequency in a series is called …….
   a) Mean b) Range c) Mode d) Median

7. Read the following statements; Choose one of the correct alternatives
   Statement 1: Mode is useful for both quantitative and qualitative data
   Statement 2: Mean is used for quantitative data only.
   a) Statement 1 is true and statement 2 is false
   b) Statement 1 is false and statement 2 is true
   c) Both statements 1 and 2 are true
   d) Both statements 1 and 2 are true

8. Read the following statements; Choose one of the correct alternatives
   Assertion(A): Median is graphically located through ogive.
   Reason (R): Median is an arithmetic average
   a) Both assertion and reason are true and reason is the correct explanation of assertion.
   b) Both assertion and reason are true and reason is not the correct explanation of assertion.
   c) Assertion is true and reason is false.
   d) Assertion is false and reason is true.

9. The most common value in a series is …….
   a) Mode b) Mean c) Median d) All the above

10. Mode is found graphically by
    a) Ogive b) Histogram c) Frequency polygon d) Bar Diagram

11. Read the following statements; Choose one of the correct alternatives
    Statement 1: C.F is used for cumulative frequency.
    Statement 2: Arithmetic Mean is the positional value.
    a) Statement 1 is true and statement 2 is false

b) Statement 1 is false and statement 2 is true

c) Both statements 1 and 2 are true

d) Both statements 1 and 2 are true

12. The arithmetic Mean of 1, 3, 5,6, X,10 is 6. The value of X is

a) 10 b) 11 c) 12 d) None of these

13. If there are two groups containing 30 and 20 observations and having 50 and 60 as arithmetic means, then the combined arithmetic mean is …….

a) 51 b) 54 c) 53 d) 52

14. Read the following statements; Choose one of the correct alternatives

Assertion(A): Inclusive class interval are converted into the exclusive class interval series before calculating Arithmetic Mean.

Reason (R): Mid-value remains the same in case of both inclusive as well as exclusive series

e) Both assertion and reason are true and reason is the correct explanation of assertion.

f) Both assertion and reason are true and reason is not the correct explanation of assertion.

g) Assertion is true and reason is false.

h) Assertion is false and reason is true.

15. To find the Median, it is necessary to arrange the data in

a) Descending order b) Ascending order

c)Ascending or descending order d) Any Random order

17. If Mean of a series is 32 and median is 40, what would be the value of mode?

a) 54 b) 58 c) 56 d) 38

18. 50% of actual values will be below and 50% of actual values will be above

a) Mode b) Median c) Mean d) Quartiles

19. Median of 2, 5, 8, 4, 9 ,6, 7 is ……

a) 9 b) 8 c) 2 d) 6

20. Which average is most suitable in case of calculating average intelligence of different employees in an office?

a) Mode b) Median c) Mean d) Median and mode

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

SHORT ANSWER QUESTIONS

1.A class consists of 50 students, out of which 30 are girls. The mean of marks scored by girls in a test is 73 (out of 100), and that of boys is 71. Determine the mean score of the whole class.

Solution:

Given,

Total number of students in a class = 50

Number of girls in the class = 30

Number of boys in the class = 50 – 30 = 20

Mean marks scored by girls = 73

Mean marks scored by boys = 71

Thus, the total marks scored by girls = 73 × 30 = 2190

Also, the total marks scored by boys = 71 × 20 = 1420

Mean score of the class = (Total marks scored by girls and boys)/Total number of students

= (2190 + 1420)/50

= 3610/50= 72.2

2. Calculate the mean for the following distribution.

Class interval	10 – 25	25 – 40	40 – 55	55 – 70	70 – 85	85 – 100
Number of students	2	3	7	6	6	6

C.I	Number of students (F)	X/M	d = X - A	F d
10 – 25	2	17.5	-30	-60
25 – 40	3	32.5	-15	-45
40 – 55	7	47.5 = a	0	0
55 – 70	6	62.5	15	90
70 – 85	6	77.5	30	180
85 – 100	6	92.5	45	270
	$\sum f_i = 30$			$\sum f\ d = 435$

$$\text{Mean} = A + (\sum f\ d / \sum f)$$

$$= 47.5 + (435/30)$$

$$= 47.5 + 14.5$$

$$\text{Mean} = 62$$

3. Calculate the median marks of students from the following distribution.

Marks	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Number of Students	7	10	10	20	20	15	8

Solution:

Class interval	Number of students (frequency)	Cumulative frequency
10 – 20	7	7
20 – 30	10	17
30 – 40	10	27 = cf
40 – 50	20 = f	47
50 – 60	20	67
60 – 70	15	82
70 – 80	8	90

N/2 = 90/2 = 45

Cumulative frequency greater and nearer to 45 is 47, which lies in the interval 40 – 50

Median class is 40 – 50.

Lower limit of the median class = l = 40

Class size = h = 10

Frequency of the median class = f = 20

Cumulative frequency of the class preceding the median class = cf = 27

$Median = l + (N2 - cf/f) \times h$

Median = 40 + [(45 – 27)/20] × 10

= 40 + (18/2)

= 40 + 9

M= 49

4. Calculate the mode as follows:

Class	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	2	$4 = f_0$	$7 = f_1$	$6 = f_2$	1

L= 30

h = 10

Mode = $L+ [(f_1 – f_0)/ (2f_1 – f_0 – f_2)] \times h$

Mode = $30 + [(7 – 4)/ (14 – 4 – 6)] \times 10$

= 30 + (30/4)

= 30 + 7.5

= 37.

5. Calculate median from the following series

X	3	4	5	6	7
F	3	12	18	12	3

Solution

X	F	CF
10	3	3
11	12	15
12	18	33
13	12	45
14	3	48
	48	

M = (N+1)/2 th item

M = 48+1/2 th item

M = 49/2 th item

M = 24.5 th item

M = 12

****

CORRELATION

Important terms and concepts

Correlation studies the relationship between tow variables in which change in the value of one variable causes change in the other variable. It is denoted by letter ‘r’.

Definition: ‘When the relationship is of a quantitative nature, the appropriate statistical tool for discovering and measuring the relationship and expressing it in a brief formula is known as correlation’.

Kinds of Correlation: -

1. Positive and Negative correlation.
2. Linear and non – linear correlation.
3. Simple and multiple correlations.

Positive correlation: When both variables move in the same direction. If one increases, other also increases and vice-versa.

Negative correlation: - When two variables move in the opposite direction, they are negatively correlated.

Linear Correlation: - When two variables change in a constant proportion.

Non- linear correlation: - When two variables do not change in the same proportion.

Simple correlation – Relationship between two variables are studied.

Multiple Correction – Relationship between three or more than three variables are studied.

Degrees of Correlation

Degree	**Positive**	**Negative**
Perfect	+1	-1
High	Between +0.75 to +1	Between -0.75 to -1
Moderate	Between +0.25 to +0.75	Between -0.25 to -0.75
Low	Between +0 to +0.25	Between -0 to -0.25
Zero	0	0

1. **Perfect Correlation -** When values of both variables changes at a constant rate Types – (a) Perfect positive correlation – when values of both variables changes at a constant ratio in the same direction correlation coefficient value (r) is + 1
   (b) Perfect negative correlation – When values of both the variables change at a constant ratio in opposite direction. Value of coefficient of correlation is -1

2. **Absence of correlation:** When there is no relation between the variables r = 0
3. **Limited degree correlation:** The value of r varies between more than O and less than 1

Different methods of finding correlation

a) Scatter Diagram
b) Karl Spearman's Coefficient of Correlation
c) Spearman's rank correlation

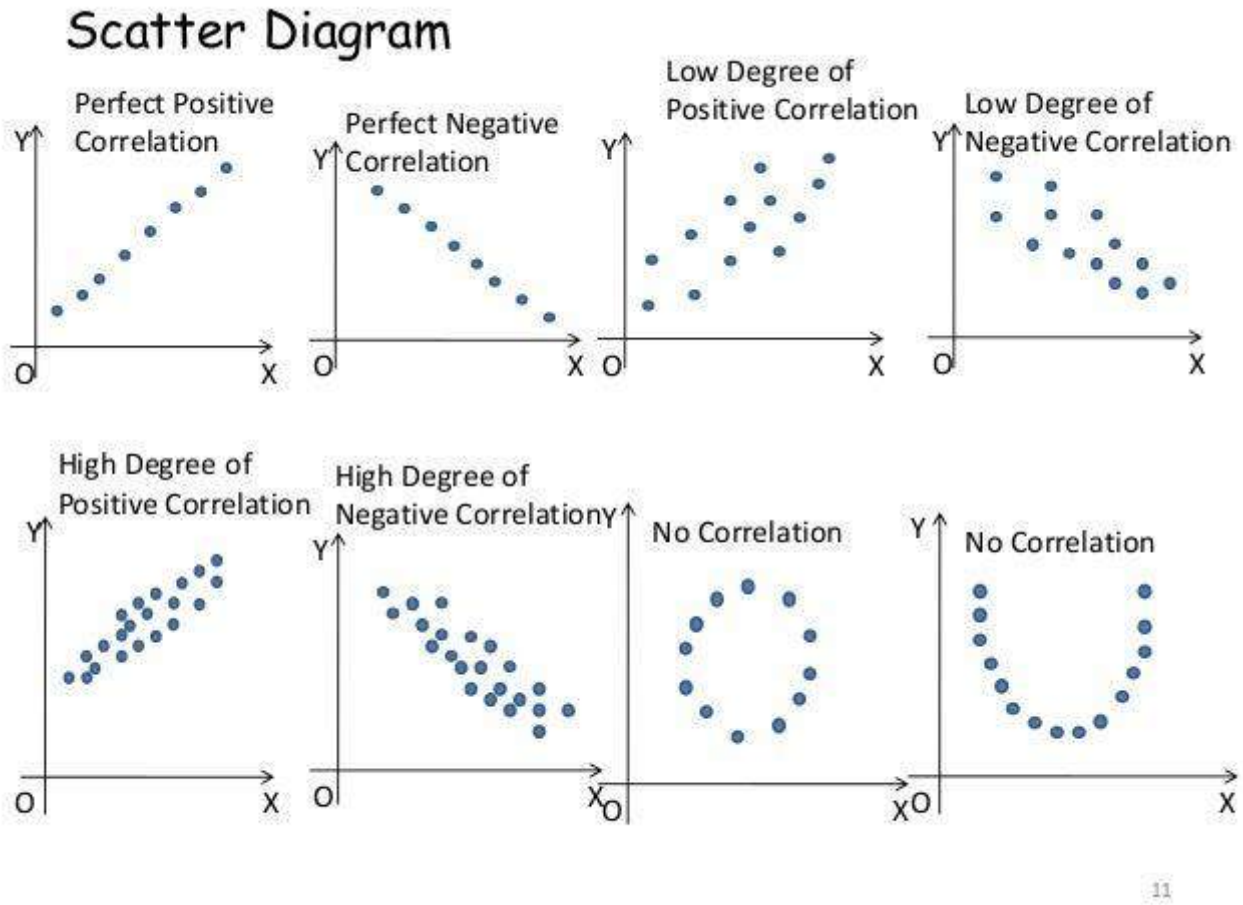
SCATTER DIAGRAM

It is a simple and attractive method of diagrammatic representation of a bivariate distribution to determine the nature of correlation between the variables.

Scatter plots are valuable because they provide a visual representation of data points and allow analysts to quickly assess relationships between variables, identify patterns, and detect outliers. They are commonly used in various fields including statistics, engineering, economics and social sciences.

Interpretation of Scatter Diagram

1. Perfect positive correlation: The correlation coefficient (often denoted as r) is +1. When plotted on a graph, the data points form a straight line that slopes upwards from left to right.
2. Perfect negative correlation: If all the points of a scatter diagram fall on a straight line with negative slope, then the correlation is said r = -1.
3. Positive correlation: When all the points of a scatter diagram cluster around a straight line going upwards from left to right.
4. Negative correlation: When all the points of a scatter diagram cluster around a straight line with Negative slope.
5. No correlation: If the points are scattered in a haphazard manner, then it is a case of zero or no correlation.



Merits and Demerits of Scatter Diagram

Merits

a) It is a simple and a non-mathematical method
b) It can be easily understood and interpreted
c) It is not influenced by size of the extreme values
d) It is first step in investigating the relationship between two variables.

Demerits

a) It is a non-mathematical method
b) It is not suitable for large observations
c) It does not imply causation
d) It gives a rough idea of the degree and nature of correlation

Karl Pearson's Method: Karl Pearson has given a quantitative method of calculatingcorrelation

$$r = \frac{\Sigma xy}{N\sigma \times \sigma y}$$

Where X = X – X, Y = Y – Y

N = number of observations

σ X = Standard deviation of series X

σ Y = Standard deviation of series Y

OR

Actual Mean Method

$$R = \frac{\Sigma xy}{\sqrt{\Sigma x^2 \times \Sigma y^2}}$$

Where x = X – X, y = Y – Y

Calculate coefficient of co-relation given the following data:

X	15	18	21	24	27
Y	25	25	27	31	32

Solution:

X	Deviation ($x = X - \bar{X}$) $\bar{X} = 21$	Square of deviation (x^2)	Y	Deviation ($y = Y - \bar{Y}$) $\bar{Y} = 28$	Square of deviation (y^2)	Multiple of deviation (xy)
15	-6	36	25	-3	9	18
18	-3	9	25	-3	9	9
21	0	0	27	-1	1	0
24	3	9	31	3	9	9
27	6	36	32	4	16	24
105		90	140		44	60

$$R = \frac{\Sigma xy}{\sqrt{\Sigma x^2 \times \Sigma y^2}} \qquad \frac{60}{\sqrt{90 \text{ x } 44}}$$

= +0.95 It is situation of high degree of positive correlation.

Spearmans's Rank Correlation Method

Formula: 1) In case of non-repeated ranks

$$R = 1 - \frac{6\sum D^2}{N^3-N}$$

r_s = Spearman's rank correlation

ΣD^2 = Sum of squares of difference of ranks

N = Number of observations

A) The percentage of marks secured by 5 students is given below. Calculate rank Correlation.

X	Y	R_1	R_2	D	D^2
60	85	1	1	0	0
48	60	5	4	1	1
49	55	4	5	-1	1
50	65	3	3	0	0
55	75	2	2	0	0
					2

$$R = 1 - \frac{6\sum D^2}{N^3-N}$$

$$R_K = 1 - 6x\ 2/5^3 - 5$$

$$R_k = 1 - 0.1 = 0.9$$

2) In case of repeated ranks

$$R_k = 1 - \frac{6\sum D^2\,(1/12\,(m^3-m) + (m^3-m) + \ldots\ldots}{N^3-N}$$

$D = R_1 - R_2$

m= no. of times a particular value or rank is repeated

B) The percentage of marks secured by students in economics and statistics. Calculate rank Correlation.

Statistics	15	10	20	28	12	10	16	18
Economics	16	14	10	12	11	15	18	12

Marks in Statistics (x)	Rank R1	Marks in Economics (y)	Rank R2	D=R1-R2	D^2
15	5	16	2	3.0	9.00
10	7.5	14	4	3.5	12.25
20	2	10	8	-6	36.00
28	1	12	5.5	-4.5	20.25
12	6	11	7	-1	1.00
10	7.5	15	3	4.5	20.25
16	4	18	1	3	9.00
18	3	12	5.5	-2.5	6.25
N = 8					$\sum D^2 = 114$

$$R_k = 1 - \frac{6\sum D^2 (1/12 (m^3-m) + (m^3-m) + \ldots\ldots}{N^3-N}$$

$$= 1 - \frac{6 \times 114 (1/12 (8-2) + (8-2)}{8^3 - 8}$$

$$R_k = 1 - 1.36$$

$$= -0.36$$

MULTIPLE CHOICE QUESTIONS

1. Karl Pearson's coefficient of correlation ranges from

   a) +1 to -1
   b) -1 to 0
   c) 0 to 1
   d) -2 to +2

2. Read the following statements and choose the correct alternative
   Statement 1: Scatter diagram indicates the exact numerical value of correlation
   Statement 2: Scatter diagram does not require to calculate any number.

   a) Statement 1 is true and statement 2 is false
   b) Statement 1 is false and statement 2 is true
   c) Both statements 1 and 2 are true
   d) Both statements 1 and 2 are true

3. Assertion (A): Correlation does not tell about cause and effect relationship.
   Reason (R): Correlation studies the relationship between two variables

   a) Both assertion and reason are true and reason is the correct explanation of assertion.
   b) Both assertion and reason are true and reason is not the correct explanation of assertion.
   c) Assertion is true and reason is false.
   d) Assertion is false and reason is true.

4. If $r_{xy} = 0$, the variable X and Y are …….
   a) linearly related
   b) not linearly related
   c) Independent
   d) None of the above

5. If the relationship between x and y is positive, as variable y decreases, variable x ……
   a) Increases
   b) Decreases
   c) Remains same
   d) Changes linearly

6. Read the following statements; Choose one of the correct alternatives

   Assertion(A): The correlation between height and weight of a person is positive.

   Reason (R): Positive correlation means the movement of two variables in the same direction.

   a) Both assertion and reason are true and reason is the correct explanation of assertion.
   b) Both assertion and reason are true and reason is not the correct explanation of assertion.
   c) Assertion is true and reason is false.
   d) Assertion is false and reason is true.

7. The lowest strength of association is reflected by which of the following correlation coefficients?

   a) 0.95 b) -0.60 c) -0.35 d) 0.29

8. When r = 1 all points in a scatter diagram would lie
   a) On a straight line directed from lower left to upper right
   b) On a straight line
   c) On a straight line directed from upper left to lower right
   d) Both a) and b)

9. Correlation coefficient is ……. of the units of measurement.

   a) Independent b) Dependent c) Both a) and b) d) None of these

10. The correlation between shoe size and intelligence is

    a) Negative b) Positive c) Zero d) None of these

11. When we study correlation between two variables, it is called …….

    a) Partial b) Simple c) Multiple d) double

12. Which of the following statements is not true?

a) The correlation is said to be linear of the ratio of change between two variables is constant
b) Linear correlation is indicated by a straight line on the graph paper
c) Linear correlation is always positive
d) If there are two variables X and Y then change in X/Change in Y is constant, it will be linear correlation.

13. Which of the following would not allow you to calculate correlation?

a) A negative relationship between X and Y
b) A positive relationship between X and Y
c) A curve linear relationship between X and Y
d) A linear relationship between X and Y

14. Karl Pearson's coefficient is defined from

a) Ungrouped data
b) Grouped data
c) Both a) and b)
d) None of these

15. If there is a perfect disagreement between the marks in geography and statistics then that would be

The value of rank correlation coefficient?

a) 1 b) any value c) -1 d) (b) or (c)

1. a)	2. b)	3. a)	4. c)	5. b)
6. a)	7. d)	8. a)	9. a)	10. c)
11. b)	12. c)	13. c)	14. a)	15. c)

SHORT ANSWER QUESTIONS

1. Discuss the merits and demerits of scatter diagram.

   Ans: Scatter diagram is a diagrammatic representation of a bivariate contribution to determine the nature of correlation between the variables.

Merits

e) It is a simple and a non-mathematical method
f) It can be easily understood and interpreted
g) It is not influenced by size of the extreme values
h) It is first step in investigating the relationship between two variables.

Demerits

e) It is a non-mathematical method
f) It is not suitable for large observations
g) It does not imply causation
h) It gives a rough idea of the degree and nature of correlation

2. When is rank correlation more precise than simple correlation coefficient?

Ans. Rank correlation is more precise than simple correlation coefficient in the following

situations

a) Rank method is very useful when the data is qualitative in nature like honesty, beauty, intelligence etc. In such cases, ranks are assigned to different items under consideration.
b) Rank correlation method is also preferred over the simple correlation coefficient may be misleading values are present in the data. In such a case, simple correlation coefficient may be misleading.

3. Explain what correlation measures and how it is interpreted in statistics.

Answer: Correlation measures the strength and direction of the linear relationship between two

variables. It is a statistical technique used to quantify how strongly pairs of variables

are related to each other. The correlation coefficient, denoted as r, ranges from -1 to +1:

- A correlation coefficient close to +1 indicates a strong positive relationship, meaning as one variable increases, the other variable also tends to increase.
- A correlation coefficient close to -1 indicates a strong negative relationship, meaning as one variable increases, the other variable tends to decrease.
- A correlation coefficient close to 0 indicates no linear relationship between the variables.
- Correlation does not imply causation; it only measures the strength and direction of the linear association between variables.
- Factors such as outliers, non-linear relationships, and confounding variables can affect the interpretation of correlation coefficients.
- It is crucial to assess correlation in conjunction with other statistical techniques and considerations to draw meaningful conclusions about relationships between variables.

4.Calculate Karl Pearson's coefficient of correlation

X	24	22	25	27	23	26
Y	18	14	22	20	19	24

X	Y	x	y	x^2	Y^2	xy
24	18	-0.5	-1.5	0.25	2.25	0.75
22	14	-2.5	-5.5	6.25	30.25	13.75
25	22	0.5	2.5	0.25	6.25	1.25
27	20	2.5	0.5	6,25	0.25	1.25
23	19	-1.5	-0.5	2.25	0.25	0.75
26	24	1.5	4.5	2.25	20.25	6.75
147	117			17.5	59.5	24.5

X= 147/6 = 24.5 Y = 117/6 = 19.5

$R = \sum xy/\sqrt{\sum x^2 \cdot \sqrt{\sum y^2}}$

$= \underline{24.5}$

$\sqrt{17.5}\ \sqrt{59.5}$

= 24.5/32.22 = 0.76

5.Calculate coefficient of rank correlation

X	85	60	55	65	75	90
Y	60	48	49	50	55	62

Solution

X	Y	R1	R2	D	D^2
85	60	2	2	0	0
60	48	5	6	-1	1
55	49	6	5	1	1
65	50	4	4	0	0
75	55	3	3	0	0
90	62	1	1	0	0
					2

$$R_k = \frac{1 - 6\sum D^2}{N^3 - N}$$

$= 1 - 6 \times 2/216 - 6$

$= 1 - 12/210$

$= 1 - 0.06$

$= 0.94$

6. Read the given cases carefully and answer the questions on the basis of the same.

In real life two or more than two variables may be mutually related. For example, change in Price of a commodity leads to change in its quantity demanded. For study of this relation, We use correlation. Correlation between different variables may be either positive or negative. When variables change in a constant proportion it is called linear correlation. When two Variables do not change in any constant proportion the correlation is non-linear.

a) What do we use for studying relation between two or more variables?
   Ans. Correlation
b) What is linear correlation?
   Ans. When variables change in a constant proportion it is known as linear correlation
c) Give an example of non-linear correlation.
   Ans. Change in price leading to change in quantity demanded.

7. Read the following case carefully and answer the question given below

XYZ Company is interested in understanding the relationship between employee satisfaction and productivity. They have conducted a survey to measure employee satisfaction levels and collected productivity data over the past year. Analyse the data using correlation analysis and provide insights into the relationship between employee satisfaction and productivity.

Answer:

To analyse the relationship between employee satisfaction and productivity for XYZ Company, correlation analysis was conducted using the collected survey and productivity data. Correlation analysis measures the strength and direction of the linear relationship between two variables, in this case, employee satisfaction and productivity.

Here is a summary of the steps and findings:

1. Data Collection and Preparation: XYZ Company conducted a survey to measure employee satisfaction using a standardized questionnaire. Each employee was asked to rate their satisfaction level on a scale. Productivity data was also collected, typically measured as output per unit of time.
2. Calculation of Correlation Coefficient: Using statistical software or tools, the Pearson correlation coefficient (r) was calculated between employee satisfaction scores and productivity data. The Pearson correlation coefficient ranges from -1 to +1:

   A correlation of +1 indicates a perfect positive linear relationship.
   A correlation of -1 indicates a perfect negative linear relationship.
   A correlation close to 0 indicates no linear relationship.

   Based on the correlation analysis, XYZ Company can conclude that there is a significant positive relationship between employee satisfaction and productivity. This suggests that investing in strategies to enhance employee satisfaction could potentially lead to increased productivity.

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INDEX NUMBERS

Introduction to Index Numbers - meaning, types - Wholesale Price Index, Consumer Price Index and index of industrial production, uses of index numbers; Inflation and Index Numbers, Simple Aggregative Method.

Learning outcomes of this chapter

• understand the meaning of the term index number;

• become familiar with the use of some widely used index numbers;

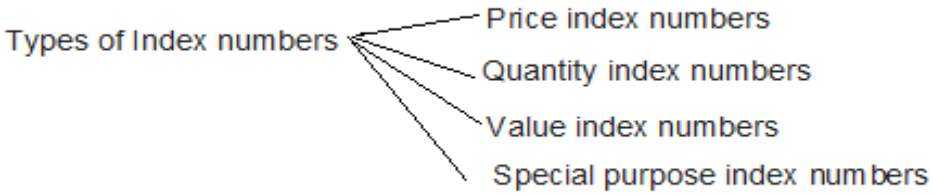
• calculate an index number;

• appreciate its limitations.

Meaning of Index Number

An index number is a statistical device for measuring changes in the magnitude of a group of related variables. It represents the general trend of diverging ratios from which it is calculated. According to Croxton and Cowden, "Index numbers are devices for measuring difference in the magnitude of a group of related variables."

Types of Index numbers



Price index numbers: A price index is a measure of changes in prices of a variable or group of variables over time. This type of index number is often used to compare the prices of the goods from one period of time to the base period. The CPI is an example of a price index.

Quantity index numbers: A quantity index number is a measure of changes in quantity between time periods. These index numbers are often used to measure things such as employment, production, or construction. An example would be an index that measures quantity changes in industrial production.

Value index numbers: A value index number measures changes in the aggregate value of a variable or group of variables over time. Value index numbers are used to track changes in things such as trade, inventories, and sales.

Special purpose index numbers: Special purpose index numbers are those that are constructed for a specific purpose that does not fit into the other categories. These index numbers are typically designed to track changes in a specific industry, sector, or unique variable group. Index numbers that track changes in the stock market are an example of a special purpose index number.

CONSTRUCTION OF AN INDEX NUMBER

The Aggregative Method

There are two methods of constructing simple index numbers.

(i) Simple Aggregative Method In this method, we use the following formula

$$P_{01} = \frac{\Sigma P_1}{\Sigma P_0} \times 100$$

Here, P_{01} = Price index of current year
ΣP_1 = Sum of prices of the commodities in the current year
ΣP_0 = Sum of prices of the commodities in the base year
(ii) Simple Average of Price Relatives Method
According to this method, we first find out price relatives from each commodity and then take simple average of all the prices relatives.
Current year price (P1) Base year price (P0)×100
We can find out price index number of the current year by using the following formula

P01=∑[P1P0×100] N

Weighted Index Numbers

Weighted Average of Price Relative Method
According to this method, weighted sum of the price relatives is divided by the sum total of the weight. In this method, goods are given weight according to their quantity, thus

$$P_{01} = \frac{\Sigma P_1 q_0}{\Sigma P_0 q_0} \times 100$$

Here, P_{01} = Index number for the current year in relation to the base year
W = weight
R = price relative

This method uses the base period quantities as weights. A weighted aggregative price index using base period quantities as weights, is also known as **Laspeyre's price index.**

Since the current period quantities differ from the base period quantities, the index number using current period weights gives a different value of the index number

$$P_{01} = \frac{\Sigma P_1 q_1}{\Sigma P_0 q_1} \times 100$$

It uses the current period quantities as weights. A weighted aggregative price index using current period quantities as weights is known as Paasche's price index.

Method of Averaging relatives

When there is only one commodity, the price index is the ratio of the price of the commodity in the current period to that in the base period, usually expressed in percentage terms. The method of averaging relatives takes the average of these relatives when there are many commodities. The price index number using price relatives is defined as

$$P_{01} = \frac{1}{n} \Sigma \frac{p_1}{p_0} \times 100$$

where P1 and Po indicate the price of the ith commodity in the current period and base period respectively. The ratio (P1 /P0) × 100 is also referred to as price relative of the commodity. n stands for the number of commodities.

The weighted index of price relatives is the weighted arithmetic mean of price relatives defined as

$$P01 = \frac{\sum_{i=1}^{n} Wi \left(\frac{P1i}{P0i} \times 100 \right)}{\sum_{i=1}^{n} Wi}$$

where W = Weight. In a weighted price relative index weights may be determined by the proportion or percentage of expenditure on them in total expenditure during the base period.

Consumer Price Index Number

Consumer price index (CPI), also known as the cost of living index measures the average change in retail prices. Consider the statement that the CPI for industrial workers (2001=100) is 277 in December 2014. What does this statement mean? It means that if the industrial worker was spending Rs 100 in 2001 for a typical basket of commodities, he needs Rs 277 in December 2014 to be able to buy an identical basket of commodities. It is not necessary that he/she buys the basket. What is important is whether he has the capability to buy it.

This exercise shows that the cost of living has declined by 2.14%

$$CPI = \frac{\Sigma WR}{\Sigma W} = \frac{9786.85}{100} = 97.86$$

Wholesale Price Index

The Wholesale price index number indicates the change in the general price level. Unlike the CPI, it does not have any reference consumer category. It does not include items pertaining to services like barber charges, repairing, etc.

Index of Industrial production

Unlike the Consumer Price Index or the Wholesale Price Index, this is an index which tries to measure quantities. With effect from April 2017, the base year has been fixed at 2011-12 = 100. The reason for the fast changes in the base year is that every year a large number of items either stop being manufactured or become inconsequential, while many other new items start getting manufactured.

While the price indices were essentially weighted averages of price relatives, the index of industrial production is a weighted arithmetic mean of quantity relatives with weights being allotted to various items in proportion to value added by manufacture in the base year by using Laspeyre's formula:

$$IIP_{01} = \frac{\sum_{i=1}^{n} q_{1i} W_i}{\sum_{i=1}^{n} W_i} \times 100$$

Issue in the construction of index numbers:

1)Purpose of Index Numbers: - There are various type of index numbers, contracted with the different objectives. Before constructing an index numbers, one must define the objective.

- **For example,** if the objective is to study the impact of change in the value of money on the consumers one should study the impact of change in the value of money on consumers, one should construct consumer price index.
- **If we** are to study the impact of change in the purchasing power of money on the producers, we shall construct index number on the basis of wholesale prices.

2) Selection of base year: - Selection of base year is another problem in the construction of index numbers. Base year is the reference year.

It is the year with which prices of current year are compared. As for as possible, base year should be normal one.

3) Selection of Goods and services: - It is neither possible nor desirable to include all the goods and services produced in the country. If we have to choose goods and services which represent most of others in the market.

4**) Selection of Prices of the goods and services: -** Broadly in the construction of price index, the problem is whether to adopt retail prices or whole sale prices, controlled or open market prices. The choice would depend upon the objective or purpose of study.

5) Selection of weights: - While constructing of index number, weights are accorded to different commodities according to their relative significance.

There are several methods of according weights i.e. Fisher's methods, Paasche's methods, Laspeyre's method

While constructing weighted index numbers, one must justify his choice of weighting technique in accordance with the nature and objective his study.

6) Selection of formula: - Index numbers can be constructed with the help of many formulae, such as, Laspeyre's method, Paasche's method, Fisher's methods. One has to decide about the method to be used while constructing the index numbers.

Uses of Index Numbers

1)Measurement of change in price level or the value of money: - It measures the value of money during a different period of time.

We can use the index numbers to know the impact of the change in the value of money on different section s of society.

2) Knowledge of change in Standard of Living: - It helps to know the standard of living of people. **Money** income may increase but if index numbers show a decrease in the value of money, living standard may even decline. Thus, index numbers indicate change in real life.

3) Adjustment in salaries and Allowance: - Cost of living index is a useful guide to the government and private enterprises to make necessary adjustments in the salaries and allowances of the workers. **Increase** in the cost of living index suggests increases in the salaries and allowances.

4) Useful to the business community: - Price index numbers serve a useful guide to the business community in their planning and decisions

5) Information regarding production: - Index numbers of production shows whether the level of agricultural and industrial production in the economy is increasing or decreasing. **Accordingly,** agricultural and industrial development policies are framed.

6) Information regarding foreign trade: Index of exports and imports provides useful information regarding foreign trade. Accordingly, export – imports polices are framed.

7) Useful to politician: - Politician come to know of the real economic condition in the country on the basis of index numbers.

8**) Useful to the government**: - With the help of index numbers government formulates appropriate policies to increase investment, output, income, employment, trade, price level, consumption etc.

An inflation index number is used to track the inflation rate, and it also measures changes in the general cost level over a while. It is called inflation when the cost level rises.

Limitations of index numbers:

Index numbers are useful in practice. However, they suffer from certain limitations. Therefore, they are not completely reliable.

1) Based on samples:

Index numbers are generally based on samples. We cannot include all the items in the construction of the index numbers. Hence, they are not free from sampling errors.

2) Bias in the data:

Index numbers are constructed on the basis of various types of data which may be incomplete. There may be bias in the data collected. This is bound to affect the results of the index numbers.

3) Misuse of Index Numbers:

Index numbers can be misused. They compare a situation in the current year with a situation in the base year. Hence a person may choose a base year which will be suitable for his purpose. For example, a businessman may choose a year in which his profit is high as the base year and show that his profit is falling in the current years.

4) Defects in formulae:

There is no perfect formula for the construction of an index number. It is only an average and so it has all the limitations of an average.

5) Changes in the economy:

The habits, tastes and expectations of the people in a country are always changing and all these changes cannot be included in the estimation of index numbers.

6) Qualitative changes:

The price or quantity index numbers may ignore the changes in qualities of the products. At any given time, a better-quality commodity will have a higher production cost and a higher price than an ordinary commodity which is a substitute for the better product.

7) Arbitrary weights:

An index number has a limited scope because it is constructed for one purpose then it can not be used for another purpose.

MCQs

1. An index number of which accounts for the relative importance of the items is known as
   (i) **weighted index**
   (ii) simple aggregative index
   (iii) simple average of relatives

2. In most of the weighted index numbers the weight pertains to
   (i) **base year**
   (ii) current year
   (iii) both base and current year
3. The impact of change in the price of a commodity with little weight in the index will be
   (i) **small**
   (ii) large
   (iii) uncertain
4. A consumer price index measures change in
   (i) **retail prices**
   (ii) wholesale prices
   (iii) producer prices

5. The item having the highest weight in consumer price index for industrial workers is
   (i) **Food**
   (ii) Housing
   (iii) Clothing
6. In general, inflation is calculated by using
   (i) **wholesale price index**
   (ii) consumer price index
   (iii) producers' price index

7. Which of the following are the major characteristics of index numbers?
   (i) It is expressed in percentages
   (ii) It measures the net or relative changes in variables
   (iii) It measures changes over a period of time
   (iv) **All of the above**
8. The index number for base year is always:
   (i) 1000
   (ii) 200
   (iii) **100**

9. The time period for which an index number is determined is known as:
    (i) Base period
    (ii) Normal period
    (iii) **Current period**
10. Index number is a type of:
    (i) Dispersion
    (ii) Correlation
    (iii) **Average**
11. Which of the following statements is/are correct about average prices if the price index is 110?
    (i) **The prices have increased by 10 per cent**
    (ii) The prices have increased by 110 per cent
    (iii) The prices have decreased by 10 per cent
12. Which of the following are limitations of using index numbers?
    (i) The use of each index number is restricted to a specific object
    (ii) It ignores the quality of commodities
    (iii) It is useful only for short term comparison
    (iv) **All of the above**
13. Which of the following is the variation within two or more variable studies by the index?
    (i) Price index
    (ii) **Composite index**
    (iii) Simple index
14. The weights used in a quantity index are:
    (i) Quantity
    (ii) Values
    (iii) **Price**
15. Which of the following methods is used to calculate the Consumer Price Index?
    (i) **Laspeyres's formula**
    (ii) Fisher's formula
    (iii) Palgrave's formula
16. An index number that can serve many purposes is known as a:
    (i) **General purpose index**
    (ii) Special purpose index
    (iii) Both a and b are incorrect
    (iv) Both a and b are correct

17. Fisher's method of calculating the index number is based on the:
    (i) **Geometric mean**
    (ii) Arithmetic mean
    (iii) Harmonic mean
18. What is the name of the monthly price index that takes price changes in consumer goods and services and uses it to determine changes in the price of those products over a period of time?
    (i) Wholesale price index
    (ii) **Consumer price index**
    (iii) Paasche's index
19. Commodities that show considerable price fluctuations can be measured by a:
    (i) Value index
    (ii) Price index
    (iii) **Quantity index**
20. The purchasing power of money is:
    (i) Not equal to the price index number
    (ii) **Reciprocal of the price index number**
    (iii) Equal to the price index number

ASSERTION -REASONING BASED MCQS

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A)

(c) Assertion (A) is true, but Reason (R) is false

(d) Assertion (A) is false, but Reason (R) is true

Q1: Assertion (A) Index number serves as the barometer for measuring the value of money in an economy.

Reason (R) Index numbers have universal acceptance thus can be applied in any case.

Q2: Assertion (A) A better way to estimate GDP accurately is to deflate input and output prices through separate indices.

Reason (R) When output prices move relatively faster than the input prices, the single deflation method overestimates GDP.

Q3: Assertion (A) Value index is based upon both price and quantity.

Reason (R) Value is calculated by the product of price and quantity.

Q4: Assertion (A) Wholesale price index is used to measure the changes in the prices of goods that impacts individual.

Reason (R) Positive value of index number indicates rise in general price levels.

Q5: Assertion (A) Fisher's method of index number is considered as ideal weighted method of index numbers.

Reason (R) Fisher's method passes all statistical tests of time and factor reversal.

Q6: Assertion(A) selection of incorrect base leads to misleading conclusion.

Reason (R) A year with high fluctuations in prices should not be consider as the base year.

LONG ANSWER QUESTIONS

1. Why do we need an index number?

Index number enables us to calculate a single measure of change of a large number of items. The index numbers are needed for the general and specific purpose they are

- Measurement of Change in the Price Level or the Value of ‘Money Index number measures the value of money during different periods of time as well as we can use it to know the Impact of the change in the value of money on different sections of society. It can be worked out to correct the inflationary and deflationary gaps in the system.
- Information of Foreign Trade Index of export and import provides useful information regarding foreign trade which helps in formulating the policies of export and import.
- Calculating Real Wages CPI are used in calculating the purchasing power of money and real wage as follows
    - Purchasing power of money = 1/Cost of living index
    - Real wage = (Money wage/Cost of living index) × 100
- Measuring and Comparing Output Index of Industrial Production (IIP) gives us a quantitative figure about the change in production in the industrial sector and thus helps in comparing industrial output in different periods. Similarly, agricultural production index provides us an estimate of the production index provides us an estimate of the production in agricultural sector.
- Policy Making of Government With the help of index numbers government determines the minatory and fiscal prey and take necessary steps to develop the country.
- Indicating Stock Prices Sensex and NIFT are index numbers of share prices on BSE and NSE respectively. They serve as a useful guide for investors in the stock market. If the Sensex and Nifty are rising, investors have positive expectations about the future performance of the economy and it is an appropriate time for investment.

2. What are the desirable properties of the base period?

Base period should have the following properties

- The base year should be a normal period and periods in which extraordinary events have occurred should not be taken as base periods as they are not appropriate for general comparisons.
- Extreme values should not be selected as base period.
- The period should not be too far in the past as comparison with current period cannot be done with such base year as policies, economic and social conditions change with time.
- Base period should be updated periodically.

3. Why is it essential to have different CPI for different categories of consumers?

The Consumer Price Index (CPI) in India is calculated for different categories as under

- CPI for industrial workers.
- CPI for urban non-manual employees.
- CPI for agricultural laborers.

The reason behind calculation of three different CPIs is that the consumption pattern of the three groups (i.e., industrial workers, urban non-manual workers and agricultural laborers) differs significantly from each other. Therefore, to assess the impact of the price change on the cost of living of the three groups, component items included in the index need to be given different weights for each of the group. This necessitates the calculation of different CPI for different categories of consumers

4. What does a consumer price index for industrial workers measure?
Consumer price index for industrial workers measures the average change in retail prices of a basket of commodities which an industrial worker generally consumes. Consumer price index for industrial workers is increasingly being considered the appropriate indicator of general inflation, which shows the most accurate impact of price rise on the cost of living of common people.

The items included in CPI (Consumer Price Index) for industrial workers are food, pan, supari, tobacco, fuel and lighting, housing, clothing, and miscellaneous expenses with food being accorded the highest weight. This implies that the food price changes have a significant impact on the CPI.

5. What is the difference between a price index and a quantity index?
The difference between a price index and a quantity index is as follows

- Price index numbers measure and allow for comparison of the prices of certain goods while quantity index number measure the changes in the physical volume of production, construction or employment.
- Price index numbers are more widely used as compared to quantity index numbers.

- Price index is known as unweighted index number while quantity index number is known was weighted index numbers.

6. Is the change in any price reflected in a price index number?

No, the change in any price is not reflected in a price index number. Price index numbers measure and permit comparison of the prices of certain goods included in the basket being used to compare prices in the base period with prices in the current period. Moreover, an equal rise in the price of an item with large weight and that of an item with low weight will have different implications for the overall change in the price index.

7. The imaginary monthly per capita expenditure incurred by workers for an industrial center during 2005 and 2020 on the following items are given below. The weights of these items are 75, 10, 5, 6 and 4 respectively. Prepare a weighted index number for cost of living for 2020 with 2005 as the base.

ITEMS	PRICE IN 2005	PRICE IN 2020
FOOD	100	200
CLOTHING	20	25
FUEL & LIGHTING	15	20
HOUSE RENT	30	40
MISCELLANEOUS	35	65

ITEMS	PRICE IN 2005 (P_0)	PRICE IN 2020 (P_1)	WEIGHT (W)	$R=P_1/P_0 \times 100$	RW
Food	100	2000	75	$\frac{200}{100} \times 100 = 200$	15,000
Clothing	20	25	10	$\frac{25}{20} \times 100 = 125$	1,250
Fuel and Lighting	15	20	5	$\frac{20}{15} \times 100 = 133.33$	666.65
House Rent	30	40	6	$\frac{40}{30} \times 100 = 133.33$	799.98
Miscellaneous	35	65	4	$\frac{65}{35} \times 100 = 185.71$	742.84
			$\Sigma W = 100$		$\Sigma RW = 18,459.47$

$$\text{Cost of Living (CPI)} = \frac{\Sigma WR}{\Sigma W} = \frac{18459.47}{100} = 184.59$$

8. An enquiry into the imaginary budgets of the middle-class families in a certain city gave the following information.

ITEMS	FOOD	FUEL	CLOTHING	RENT	MISCELLANEOUS
PRICE IN 2021 (in Rs)	1500	250	750	300	400
PRICE IN 2014 (in Rs)	1400	200	500	200	250
WEIGHTS	35	10	20	15	20

What is the cost of living index of 2021 as compared with 2014?

Answer:

ITEMS	WEIGHT (W)	PRICE IN 2014 (P_0)	PRICE IN 2021 (P_1)	$R=P_1/P_0 \times 100$	RW
Food	35	1,400	1,500	$\frac{1,500}{1,400} \times 100 = 107.14$	3,749.90
Fuel	10	200	250	$\frac{250}{200} \times 100 = 125$	1,250
Clothing	20	500	750	$\frac{750}{500} \times 100 = 150$	3,000
Rent	15	200	300	$\frac{300}{200} \times 100 = 150$	2,250
Miscellaneous	20	250	400	$\frac{400}{250} \times 100 = 160$	3,200
	$\Sigma W = 100$				$\Sigma WR = 13,449.9$

$$CPI = \frac{\Sigma WR}{\Sigma W}$$
$$= \frac{13449.9}{100}$$
$$= 134.49$$

Cost of Living Index = 134.50
Thus, the price rose by 34.50% during 2014 to 2021.

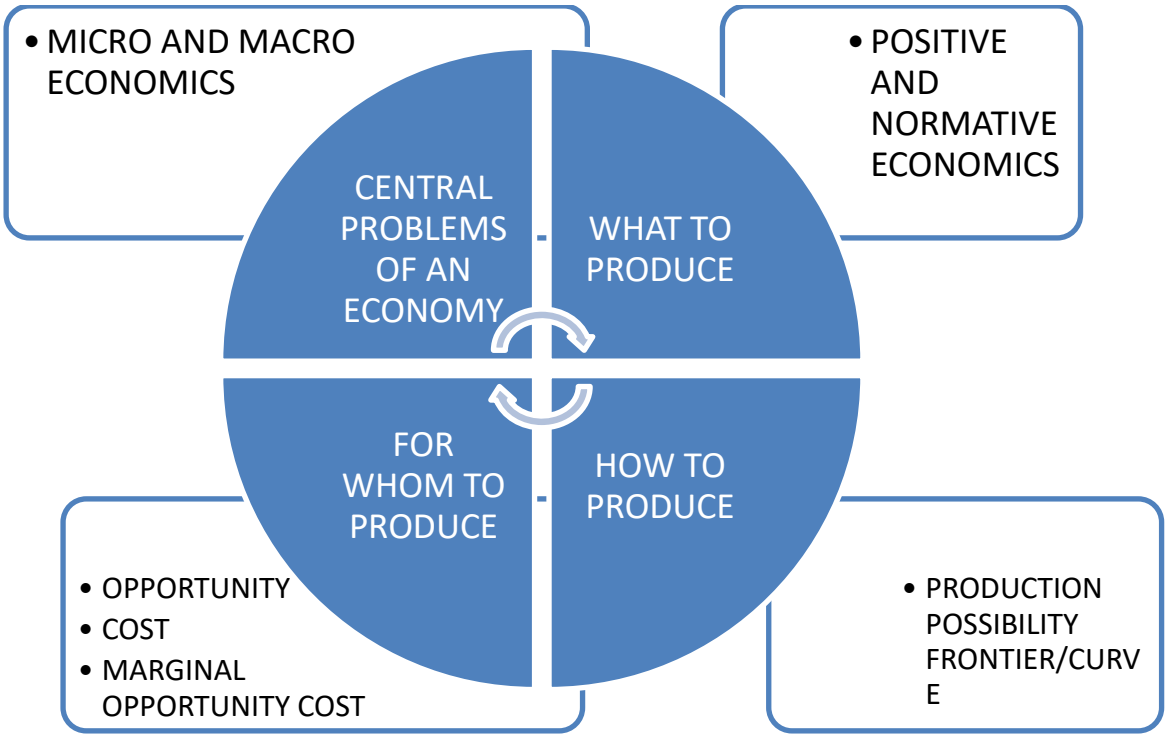
PART –B- INTRODUCTORY MICRO ECONOMICS

UNIT 4: INTRODUCTION

SECTION 1

MAIN POINTS/GIST OF THE CHAPTER

- Meaning of an economy
- Basic economic activities
  - Scarcity of Resource
    - Difference between Micro economics and macro economics
      - Difference between Positive and Normative economic analysis
      - Central problems of an economy:
        (a) What to produce
        (b) How to produce
        (c) For whom to produce.
      - Opportunity cost and Marginal opportunity cost
      - Production possibility curve/frontier
      - PPC table and graphical presentation
      - Changes in PPC



CONCEPT NOTES

- **Meaning of an economy**: The term economy refers to a system or a process which helps people to produce goods and services with the use of available resource and helps people to earn their living.

- **Basic economic activities**: Production, exchange and consumption of goods and services are the basic economic activities.

- **Scarcity of Resource**: The word 'scarcity of resource' refers to shortage of resources / limited resources. But in economics, the word scarcity stands for less supply of resource in relation to more demand. of resource.

- **Micro economics**: Microeconomics is a branch of economics that study the behavior of individual economic agents in the markets for different goods and services and try to find out how prices and quantities of goods and services are determined. The word micro means small.

- **Macroeconomics**: Macroeconomics is a branch of economics that study the behavior of an economy as a whole by focusing our attention on aggregate measures such as total output, total employment and aggregate price level. The word macro means large.

- **Positive economic analysis**: In positive economic analysis, we study how the different mechanisms of solving the central problems (what to produce, how to produce and for whom to produce) of an economy function. Positive economic statement can be verified because they are based on fact. They deal with realistic situation.

- **Normative economic analysis**: In normative economic analysis, we try to understand whether the different mechanisms of solving the central problems (what to produce, how to produce and for whom to produce) of an economy are desirable or not. The normative economic statement cannot be verified because they are not based on fact but suggestive only.

- **Central problems of an economy**: There are mainly three central problems relating to allocation of resources.

- **What to produce**: What to produce is also called the problem of resource allocation. Every society must decide on how much of each of the many possible goods and services it will produce. Whether to produce more of food items or clothing, housing or to have more of luxury goods. Whether to have more agricultural goods or to have industrial products and services. Whether to use more resources in education and health or to use more resources in building military services. Whether to have more of consumption

goods or to have capital goods which will boost production and consumption of an economy.

- **How to produce**: The problem of how to produce is also called the choice of technique of production. Every society has to decide on how much of which of the resources to use in the production of each of the different goods and services. Goods and services can be produced with the help of two techniques; they are labor intensive technique and capital-intensive technique. In labor intensive technique we use more labor and less capital. Whereas in capital intensive technique we use more capital and less labor.

- **For whom to produce**: The problem of for whom to produce is also called the problem of distribution of goods and services. Who gets how much of the goods that are produced in the economy? How should the produce of the economy be distributed among the individuals in the economy? Who gets more and who gets less? Whether or not to ensure a minimum amount of consumption for everyone in the economy. Whether or not elementary education and basic health services should be available freely for everyone in the economy. There are two aspects in connection with this problem; one deals with the distribution of production among the household and second is associated with distribution of production among land labor capital and organization (four factors of production).

- **Opportunity cost**: Opportunity cost is an important basic concept in the subject economics. There is always a cost of having a little more of one good in terms of the amount of the other good that has to be forgone. This is known as the opportunity cost of an additional unit of the goods. In short, we can define the term opportunity cost as the value of the benefit that is avoided by selecting an alternative.

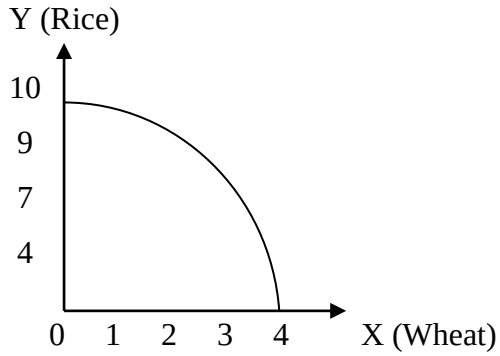
- **Marginal opportunity cost**: Suppose an economy produces only two goods X and Y. We cannot increase the production of both goods. If we want to increase the production of X good (Rice), we have to reduce the production of Y good (Wheat). This loss is called marginal opportunity cost. If the resources are transferred from one use to another, the less and less efficient resources will be transferred leading to rise in the marginal opportunity cost which is technically termed as marginal rate of transformation. We can now define MRT in general terms. MRT is the ratio of units of one good sacrificed to produce one more unit of the other good.

- **Production possibility curve/frontier**: The production possibility frontier gives the combinations of two goods say X and Y that can be produced when the resources of the economy are fully utilized. The production possibilities (PP) curve is a graphical medium of highlighting the central problem of 'what to produce' an in what quantity. This curve shows the options that are obtainable, or simply the production possibilities.

PPC Table:

Possibilities	Wheat	Rice
A	0	10
B	1	9
C	2	7
D	3	4
E	4	0

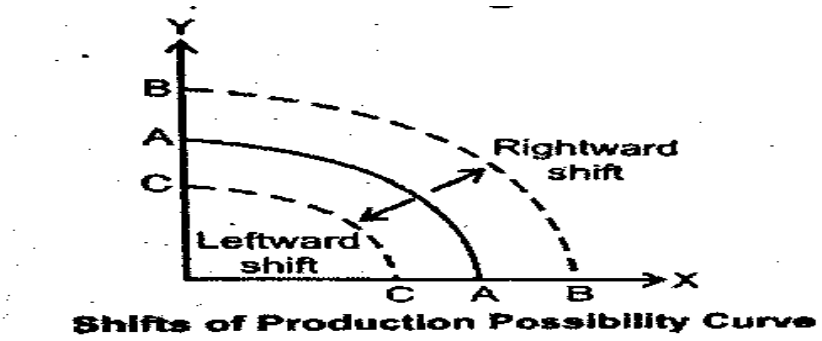
PPC Graphical Presentation:



- **Changes in PPC:**

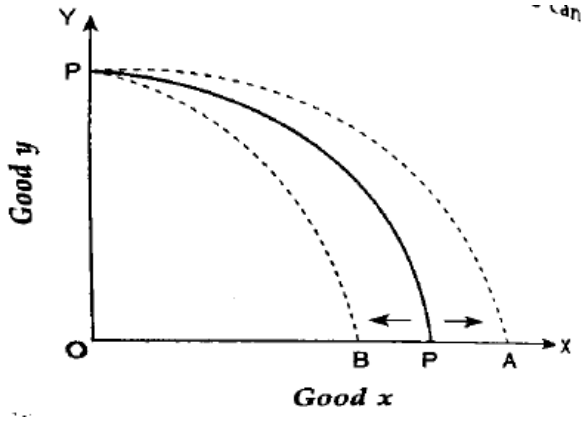
  There are two types of changes in PPC:

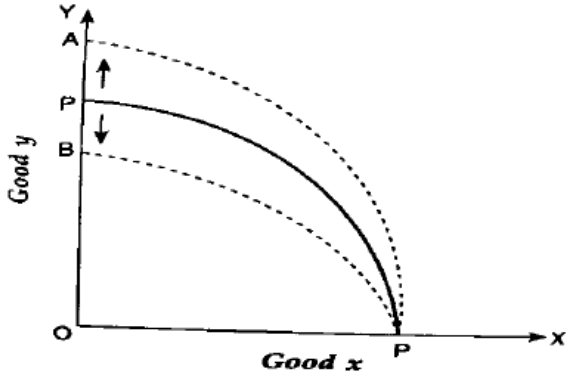
  1. **Shift in PPC** – PPC may shift to right or left, when there is change in resource or technology for both the goods, say X and Y.



Shifts of Production Possibility Curve

  2. **Rotation of PPC** – When there is change in technology or resources for only one good, say Y or X, PPC will rotate.





SECTION II: QUESTION BANK

1-MARK QUESTIONS

1) Read the following statements carefully and choose the correct alternatives given below:

Statement 1: Economic problem is a problem of choice.

Statement 2: Economic problem will not arise if the resources that satisfy wants are limited.

Alternatives:

a) Statement 1 is true and statement 2 is false
b) Statement 1 is false and statement 2 is true
c) Both Statement 1 and 2 are true
d) Both Statement 1 and 2 are false

2) Read the following statements carefully and choose the correct alternatives given below:

Statement 1: The problem of How to produce is a problem of resource allocation.

Statement 2: For Whom to Produce is also called the problem of distribution of national income among the factors of production.

Alternatives:

a) Statement 1 is true and statement 2 is false
b) Statement 1 is false and statement 2 is true
c) Both Statement 1 and 2 are true
d) Both Statement 1 and 2 are false

3) Read the following statements carefully and choose the correct alternatives given below:

Statement 1: Those combinations which could be produced using the help of given resource and technology are termed as feasible combination.

Statement 2: Those combinations which could not be produced with the help of given resource and technology are termed as unattainable combinations.

Alternatives:

a) Statement 1 is true and statement 2 is false
b) Statement 1 is false and statement 2 is true
c) Both Statement 1 and 2 are true
d) Both Statement 1 and 2 are false

4) Read the following statements carefully and choose the correct alternatives given below:

Statement 1: Positive economic analysis deals with ‘what ought to be.’

Statement 2: Normative economic analysis deals with ‘things as they are.’

Alternatives:

a) Statement 1 is true and statement 2 is false
b) Statement 1 is false and statement 2 is true
c) Both Statement 1 and 2 are true
d) Both Statement 1 and 2 are false

5) Read the following statements - Assertion (A) and Reason (R). Choose one of the correct alternatives given below:
Assertion (A): When there is change in resource or technology for goods X and Y, PPC will show rightward shift.
Reason (R): Increase in availability of resource or improvement in technology for X and Y goods.

Alternatives:
a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)
c) Assertion (A) is true but Reason (R) is false.
d) Assertion (A) is false but Reason (R) is true.

6) Read the following statements - Assertion (A) and Reason (R). Choose one of the correct alternatives given below:
Assertion (A): The problem of making choice is called economic problem.
Reason (R): Economizing resources is the essence of economic problem.

Alternatives:
a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)
c) Assertion (A) is true but Reason (R) is false.
d) Assertion (A) is false but Reason (R) is true.

7) Read the following statements - Assertion (A) and Reason (R). Choose one of the correct alternatives given below:
Assertion (A): The value of the benefit that is sacrificed by choosing an alternative is known as opportunity cost.
Reason (R): Shape of PPC does not depend on MOC.

Alternatives:
a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)
c) Assertion (A) is true but Reason (R) is false.
d) Assertion (A) is false but Reason (R) is true.

8) Read the following statements - Assertion (A) and Reason (R). Choose one of the correct alternatives given below:
Assertion (A): More production of X good is associated with more production of Y good.
Reason (R): In a situation of fuller utilization of resources, production of X and Y cannot be increased simultaneously.

Alternatives:
a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)
c) Assertion (A) is true but Reason (R) is false.
d) Assertion (A) is false but Reason (R) is true.

9) What does a point on PPC shows?
(Choose the correct alternative)

a) Underutilization of resources
b) Fuller utilization of resources
c) Growth of resources
d) All of the above

10) PPC is straight when marginal opportunity cost is ---------
(Choose the correct alternative)

a) Rises
b) Falls
c) Remains constant
d) None of the above

11) What is efficient technique of production?
(Choose the correct alternative)

a) Fuller utilization of resources
b) Economizing resources
c) Produces maximum at a minimum cost
d) None of the above

12) What does the downward slope of PPC indicate?
(Choose the correct alternative)

a) Decrease in production of one good will bring fall in the production of other good
b) Increase in the production of one good will bring increase in the production of other good
c) Production of both goods remain constant
d) Increase in the production of one good will bring fall in the production of other good

13) A farmer can produce 500 Kg of groundnuts on a piece of land. With the same resource the farmer could also produce 300 Kg of peanuts. What is the opportunity cost of producing groundnuts?

14) PPC can have three shapes. (True or false)

15) When PPC is convex in shape
(Choose the correct alternative)

a) Due to increasing MOC
b) Due to constant MOC
c) Due to decreasing MOC
d) None of the above

16) Scarcity and choice go together and they are inseparable. (True or False)

17) The problem of resource allocation stands for?
a) How to produce
b) Whom to produce
c) What to produce
d) None of the above

18) An economy can achieve the objective of growth of resource through
a) Improvement in technology only
b) Increase in supply of resource only
c) Improvement in technology and increase in supply of resource
d) None of the above

19) Identify the correct sequence of alternatives given in **Column 11** by matching them with

Respective terms in **Column 1**

Column 1	**Column 11**
(i) MOC	(a) Loss / Gain
(ii) How to produce	(b) Not verifiable
(iii) Normative economics	(c) Differ in urgency
(iv) Human wants	(d) Choice of technique of production

Choose the correct alternative:

a) (i c) , (ii d) , (iii b), (iv a)
b) (i a) , (ii d) , (iii b), (iv c)
c) (i d) , (ii c) , (iii b), (iv a)
d) (i c) , (ii b) , (iii d), (iv a)

CASE STUDY BASED

20) Read the text carefully

In general, every individual in society is engaged in the production of some goods or services and wants a combination of many goods and services, not all of which are produced by them Needless to say that there has to be some compatibility between what people in society collectively want to have and what they produce. For example, the total amount of Rice produced by family farm along with other farming units in a society must match the total amount of Rice that people in the society collectively want to consume. If people in the society do not want as much Rice as the farming units are capable of producing collectively, a part of the resources of these units could have been used in the production of some other goods or services which is in high demand.
On the other hand, if people in the society want more Rice compared to what the farming units are producing collectively, the resources used in the production of some other goods and services may be reallocated to the production of Rice. Similar is the case with all other goods or services. Just as the resources of an individual are scarce, the resources of the society are also scarce in comparison to what the people in the society might collectively want to have. The scarce resources of the society have to be allocated properly in the production of different goods and services in keeping with the likes and dislikes of the people of the society. Any allocation of resources of the society would result in the production of particular combination of different goods and services. The goods and services thus produced will have to be distributed among the individuals of the society. The allocation of the limited resources and the distribution of the final mix of goods and services are two of the basic economic problems faced by the society.

(Source: NCERT Introductory Microeconomics textbook)

On the basis of the given text and common understanding, answer the following questions:

a) Why does economic problem arise?

b) Define the term economizing resources.

c) Mention the main economic activities.

21) Read the text carefully

In microeconomic theory, the opportunity cost of a choice is the value of the best alternative forgone where, given limited resources, a choice needs to be made between several mutually exclusive alternatives. Assuming the best choice is made, it is the "cost" incurred by not enjoying the benefit that would have been had by taking the second-best available choice. As a representation of the relationship between scarcity and choice, the objective of opportunity cost is to ensure efficient use of scarce resources. It incorporates all associated costs of a decision, both explicit and implicit.

Thus, opportunity costs are not restricted to monetary or financial costs: the real cost of output forgone, lost time, pleasure, or any other benefit that provides utility should also be considered an opportunity cost.

On the basis of the given text and common understanding, answer the following questions:

a) What is opportunity cost?

b) Mention the objective of opportunity cost.

c) 'The real cost of output forgone, lost time, pleasure, or any other benefit that provides utility should also be considered an opportunity cost.'(True or False)

22) Read the following text and answer the following questions on the basis of the same:

Efficiency in production means productivity i.e. output per unit of an input. Let the input be worker. Suppose an economy produces only two goods X and Y. Suppose a worker is employed in production of X because he is best suited for it. The economy decides to reduce production of X and increase that of Y. The worker is transferred to Y. He is not that efficient in production of Y as he was in X. His productivity in Y will be low, and so cost of production high.

The implication is clear that if the resources are transferred from one use to another, the less and less efficient resources will be transferred leading to rise in the marginal opportunity cost which is technically termed as marginal rate of transformation.

a) If Marginal Opportunity Cost is increasing then the shape of PPC will be ----------.

b) Why PPC is sloping downwards from left to right?

c) Marginal opportunity cost is technically known as ------.

23) Read the following text and answer the following questions on the basis of the same:
(Case study)

Just as individuals face scarcity of resources, the resources of an economy as a whole are always limited in comparison to what the people in the economy collectively want to have. The scarce resources have alternative usages and every society has to decide on how much of each of the resources to use in the production of different goods and services. In other words, every society has to determine how to allocate its scarce resources to different goods and services. An allocation of the scarce resource of the economy gives rise to particular combination of different goods and services.

a) Economic problem is a problem of ----------.

b) Mention two important features of resources.

24) Read the following text and answer the following questions on the basis of the same:

Every society has to decide on how much of which of the resources to use in the production of each of the different goods and services. Whether to use more labor or more machines. Which of the available technologies to adopt in the production of each of the goods? Who gets how much of the goods that are produced in the economy? How should the produce of the economy be distributed among the individuals in the economy? Who gets more and who gets less? Whether or not to ensure a minimum amount of consumption for everyone in the economy. Whether or not elementary education and basic health services should be available freely for everyone in the economy. Thus, every economy faces the problem of allocating the scarce resources to the production of different possible goods and services and of distributing the produced goods and services among the individuals within the economy.

a) Mention two techniques by which goods can be produced.

b) Why countries like India prefer labor intensive technique for producing goods?

c) Which technique country like America use for the production of goods and why?

1 MARK QUESTIONS ANSWER:

Q.NO	ANSWER
1	a) Statement 1 is true and statement 2 is false
2	b) Statement 1 is false and statement 2 is true
3	c) Both Statement 1 and 2 are true
4	d) Both Statement 1 and 2 are false
5	a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
6	b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)
7	c) Assertion (A) is true but Reason (R) is false.
8	d) Assertion (A) is false but Reason (R) is true.
9	b) Fuller utilization of resources

10	c) Remains constant
11	c) Produces maximum at a minimum cost
12	d) Increase in the production of one good will bring fall in the production of other good
13	300 Kg
14	True
15	c) Due to decreasing MOC
16	True
17	c) What to produce
18	c) Improvement in technology and increase in supply of resource
19	c) (i a) , (ii d) , (iii b), (iv c)
20	a) Because the available resource is scarce in relation to unlimited human wants. b) The efficient utilization of available resource. c) Production, Consumption and capital formation.
21	a) The value of a factor in its next best alternative use. b) Ensure efficient use of scarce resources. c) True
22	a) Concave b) Production of both commodities cannot be increased simultaneously. If production of one good (say X) increases, we have to reduce the production of other (say Y). c) MRT
23	a) Problem of choice b) 1. Resources are scarce 2. It has alternative use.
24	a) 1. Labor intensive technique, 2. Capital intensive technique b) Availability of more labored force. c) Capital intensive technique. Availability of capital is high compared to that of the availability of laborers.

3MARKS / 4MARKS QUESTION ANSWERS

1) What are the main causes of economic problems?

Answer: the main causes of economics problems are as follows:

1. Limited resources
2. Unlimited human wants
3. Resource can be put to different uses
4. Human wants differ in priority

2) Explain the problem of "what to produce and in what quantity"

Answer: The problem of what to produce and in what quantity is actually the problem of resource allocation. We can produce various combinations goods and services with the available resource. Every society must decide on how much of each of the many possible goods and services it will produce. Whether to produce more of food clothing, and housing or to have more of luxury goods. Whether to have more agricultural goods or to have industrial products and services, whether to use more resources in education and health or to use more resources in building military services. Whether to have more of basic education or more of higher education, whether to have more of consumption goods or capital goods which will boost production and consumption.

3) Distinguish between Positive and Normative Economic Analysis?

Answer: This distinction between positive and normative economic analysis is not a very sharp one. The positive and the normative issues involved in the study of the central economic problems are very closely related to each other and a proper understanding of one is not possible in isolation to the other.

Positive economic analysis	Normative economic analysis
In positive economic analysis, we study how the different mechanisms function.	In normative economics, we try to understand whether these mechanisms are desirable or not.
Positive statements are verifiable.	Normative statements are not verifiable.
These are based on facts	These are not based on facts, these are suggestions.

4) Distinguish between micro and macroeconomics?

Answer: the subject matter of economics has been studied under two broad branches:
(a) Microeconomics (b) Macroeconomics

Micro economics	Macro economics
(a)In microeconomics, we study the behavior of individual economic agents Example: a textile industry, a household etc. (b) In micro economics, we try to figure out how prices and quantities of goods and Services are determined. (c)The main tools to study micro economic problems are demand and supply (d)It is again called "price theory" (e) in short, Micro means small	(a) In macroeconomics, we try to get an understanding of the economy as a whole. Example: all industries, all household etc. (b) Here, we are interested in finding out how the total output, employment and Aggregate price level is determined. (c) The main tools to study macro-economic problems are aggregate demand and aggregate supply (d) It is again known as "theory of income and employment" (e)in short, Macro means large

5) Calculate MOC from the following schedule.

Rice (tones)	0	1	2	3	4	5
Wheat(tones)	150	140	120	90	50	0

Answer: solution

Rice (quintile)	Wheat(quintile)	MOC=loss/Gain
0	150	----
1	140	10/1=10
2	120	20/1=20
3	90	30/1=30
4	50	40/1=40
5	0	50/1=50

6) What is opportunity cost? Explain with the help of an example

. Answer: Opportunity cost is an important basic concept in the subject economics. we can Define the term opportunity cost as the value of a factor in its next best alternative use. For example, if more of the scarce resources are used in the production of Good X, then fewer

resources is available for the production of good Y and vice versa. Therefore, it is very clear that if we want to have more of one of the goods, we will have less of the other good. Thus, there is always a cost of having a little more of one good in terms of the amount of the other good that has to be forgone. This is known as the opportunity cost of an additional unit of the goods. In short, we can define the term opportunity cost as the value of the benefit that is avoided by selecting an alternative.

7) What is Marginal Opportunity Cost or Marginal Rate of Transformation? Explain the concept With the help of a schedule.

Answer: Suppose an economy produces only two goods X and Y. we cannot increase the production of both goods. If we want to increase the production of X good (Rice), we have to reduce the production of Y good (Wheat). This loss is called marginal opportunity cost. If the resources are transferred from one use to another, the less and less efficient resources will be transferred leading to rise in the marginal opportunity cost which is technically termed as marginal rate of transformation

We can now define MRT in general terms. MRT is the ratio of units of one good sacrificed to produce one more unit of the other good. Or, MRT is the rate at which the units of output of one good are sacrificed to produce on more units of the other good.

MOC SCHEDULE

Rice (quintile)	Wheat(quintile)	MOC=loss/Gain
0	10	----
1	9	1/1=1
2	7	2/1=2
3	4	3/1=3
4	0	4/1=4

8) What are the assumptions of PPC?

The main assumptions of PPC areas follow

(a) The resources available are fixed.
(b) The technology remains unchanged.
(c) The resources are fully employed.
(d) The resources are efficiently employed.
(e)The resources are not equally efficient in production of all products.

9) Why is PPC slopes downward? Use diagram

PPC slopes downward, because in order to produce more units of one good say X, some units of the other good say Y must be sacrificed (because of limited resources). Production of both goods cannot be increased simultaneously.
(Use diagram)

10) Why is PPC concave in shape? Use diagram

A typical PP curve is taken to be a concave curve because it is based on a more realistic assumption that no resource is equally efficient in production of all goods. So, when Resources are transferred from production of good Y to production of good X, more and more units of good Y are to be transferred to produce one more unit of good X. (Use diagram)

6MARKS QUESTIONS

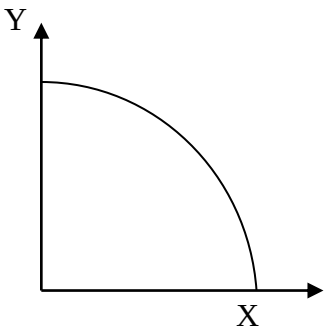
1) What do you understand by Production Possibility Curve (PPC)? Mention the main features of PPC using diagram.

Ans: We know that resources are limited in relation to demand for them. So every society has to decide how to distribute its limited resources to different goods and services. It is possible to distribute the resources in different ways, hence achieving different combinations of all goods and service. The collection of all such combinations of goods and services is termed as Production Possibility set of an economy.

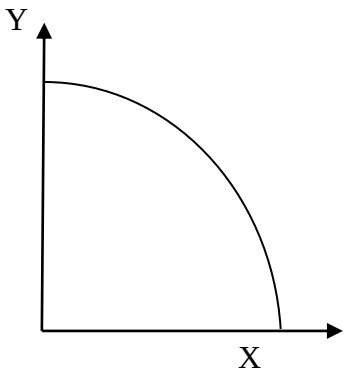
In short, PPC is a graphical presentation of different combinations of two goods that could be produced with the available resource and technology assuming that these resources are fully and efficiently utilized.

The main features of PPC are as follows:

1. PPC slopes downwards
2. PPC is concave in shape



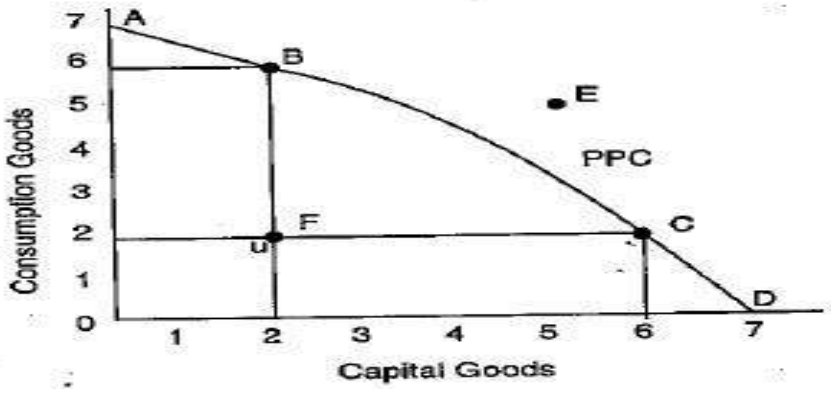
a) PPC slope downwards



b) PPC concave in shape

2) Draw a PPC and identify the points marked on PPC and mention what does each point Represent.

Ans: (i) PPC is a graphical presentation of different combinations of two goods that could be produced with the available resource and technology assuming that these resources are fully and efficiently utilized.



(a) Point E represents growth of resources
(b) Point A, B, C, D represents fuller utilization of resources
(c) Point U and F shows underutilization of resources

3) Why does economic problem arise? And explain the problem of "how to produce".

Ans: We know that production, exchange and consumption of goods and services are among the basic economic activities of life. In the course of these basic economic activities, every society has to face scarcity of resources and it is the scarcity of resources that gives rise to the problem of choice. The scarce resources of an economy can be put to alternative uses. But human wants are unlimited and differ in urgency. Thus, the causes of economic problem are:
(i) Scarcity of resources
(ii) Unlimited human wants
(iii) Resources can be put to different uses
(iv) Human wants differ in urgency

There are three central problems namely, what to Produce, How to Produce and for whom to Produce.
How to Produce: The problem of How to produce is the problem of choice of technique of production. Mainly there are two techniques, they are as follows

Labor intensive technique- Here we use more of labor and less of capital.

Capital intensive technique- In this case we use more of capital and less of labor.

Whatever technique we use, aim of every economy is to produce maximum at minimum cost and use of technique of production varies from economy to economy.

AUDIO CLIPPING ON PPC

Click the link (double click):

audio on PPC (online-audio-converter.com).mp3

Source

1. NCERT Introductory Microeconomics
2. Supplementary reading materials in economics by CBSE

UNIT 5: CONSUMER'S EQUILIBRIUM AND DEMAND

CONSUMER'S EQUILIBRIUM

Concept of Utility: Utility refers to the want satisfying power of a commodity. In other words, utility refers to satisfaction derived from the consumption of a commodity.

Types of utility:1) Cardinal utility 2) Ordinal utility.

1) Cardinal utility: - Utility which can be measured in terms of cardinal numbers, like 1,2,3 etc. Prof. Alfred Marshall believes in cardinal utility.

2) Ordinal utility: - Utility which **can't** be measured in cardinal terms, but can be 'ranked' or 'preferred. Prof. Hicks believes in ordinal utility principles.

Total Utility (TU):- Sum total of utility obtained by consuming the entire units of the given commodity. Suppose a consumer consumes 2 units of Apple, first unit gives him **10** utils and the second units gives him **8** utils, then the TOTAL UTILITY will be obtained by adding up the utility obtained from the 1st and 2nd Apples, i.e. ,10 utils + 8 utils, which is equals to **18** utils.

Marginal Utility (MU):- Addition made to the Total Utility by consuming **one more unit** of the given commodity. In the above given example, by consuming the 2nd unit of Apple, consumer obtained 8 utils, It is the MU of 2nd unit. If he consumes the 3rd unit and obtained 6 utils, then the MU of 3rd unit will be equal to 6 utils.

Thus:

MU (n) = TU (n) – TU (n-1)

As we consume more and more units of the given commodity, the MU obtained from each successive unit tends to diminish.

Relation between TU & MU

As more and more units of the given commodity are consumed, the MU obtained from each successive unit tends to diminish.
As long as MU falls and remains positive, TU rises.
TU reaches its maximum, then MU becomes zero.
When TU falls, MU become Negative.

Tabular representation

Following schedule shows the relationship between TU & MU.

No. of units consumed	Total Utility (TU)	Marginal Utility (MU)
1	10	10
2	18	8
3	24	6
4	28	4
5	30	2
6	30	0
7	28	-2

From the above table it is clear that;
As long as TU rises MU become positive, that is by consuming up to the 5th units.
When TU remains constant and is its maximum, then MU becomes zero. By consuming the 6th unit, MU become zero

When TU falls, then MU becomes negative. By consuming the 7th unit, MU becomes negative.

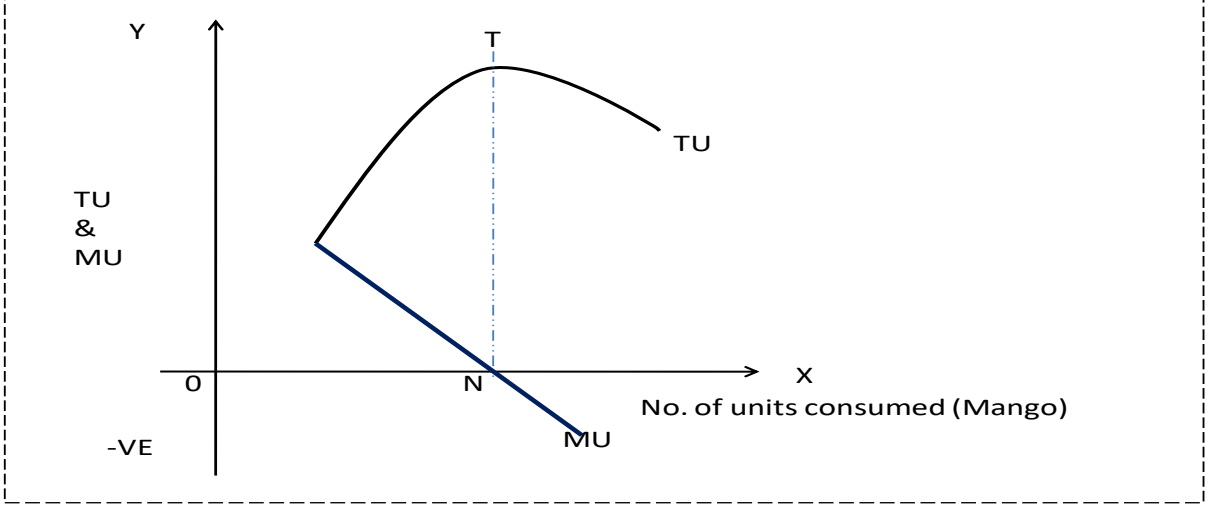
MU (n) = TU (n) – TU (n-1)

MU (3) = TU (3) – TU (3-1)

MU (3) = TU (3) – TU (2)

= 30-24
= 6

Following diagram shows the relation between TU & MU.



From the above diagram it is clear that, till the consumption of 'ON' units, TU is rising and MU become positive (but falling). By consuming the 'ON' unit TU reaches its maximum, then MU become ZERO. After 'ON' units TU falls and MU become Negative.

Law of Diminishing Marginal Utility

Law of DMU states that as long as a consumer consumes more and more units of the given commodity, without time gap, then the MU obtained from the each successive unit always declines. Also known as Gossans' first law of consumption, 'Psychological law of consumption'.

Basic assumptions
Continuous consumption
Homogeneous or identical unit.
Only standard unit of the commodity are consumed
Consumer is rational
Marginal Utility of money remains constant.

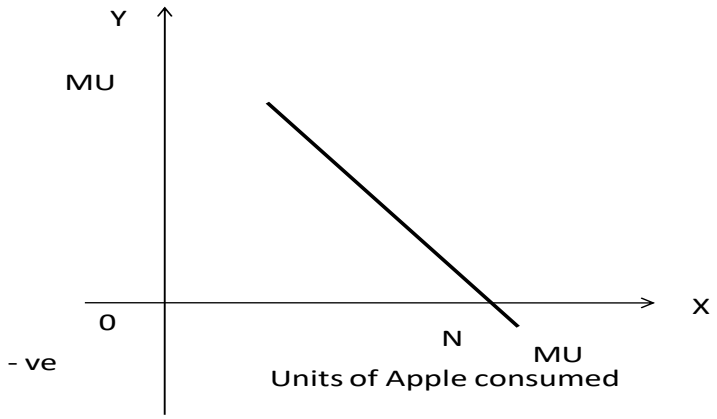
By using the following table, we can explain the law of Diminishing Marginal Utility.

No. of units consumed (Good X)	Marginal Utility (Good X)
1	10
2	8
3	6

4	4
5	2
6	0
7	-2

From the above table it is clear that by consuming the 1st unit, consumer gets 10 utils. As he consume more and more units his Marginal Utility obtained from the given commodity declines. As he consumes 6th units he gets zero utility, it is known as the point of satiety. When he consumes 7th unit, he gets negative utility.

This law can be able to understand with the help of the following diagram.



From the diagram, we can see that by consuming more and more units MU is declining and by consuming 'ON' units MU become zero and after that MU is negative.

From the above table and diagram it is clear that, when consumer continuously consumes more units of apple he will get less and less marginal utility. When he consumes 5th unit, he gets zero utility. This situation is known as point of satiety. As he consumes 6th units his marginal utility will becomes negative.

Consumer's Equilibrium

Consumer's equilibrium refers to a situation when a consumer attains maximum satisfaction by minimum spending. So consumer allocates his given income to the purchase of different goods in a manner such that his total satisfaction is maximised

Consumer's Equilibrium: (Under cardinal utility analysis)

This can be discussed under the TWO different situations. They are
1. under single commodity case,
2. under double commodity case.

Consumer's Equilibrium (Under single commodity case)

Under single commodity, a consumer reaches equilibrium when the following conditions are achieved. ie,
a) MU falls as consumption of the commodity increases. (Law of DMU)
b) MU(x) is equal to the price paid for that good.

MU(x) = Price (x)

If MU(X) is more than the price paid for it, then consumer will not be in equilibrium. He should **increase the consumption** to reach the equilibrium, till MU(X) become equal to P(x).

On the other hand, If MU(X) is less than the price paid for it, and then consumer will not be in equilibrium. He should **decrease the consumption** to reach the equilibrium, till MU(X) become equal to P(x).

Consumer's Equilibrium
Schedule & diagram

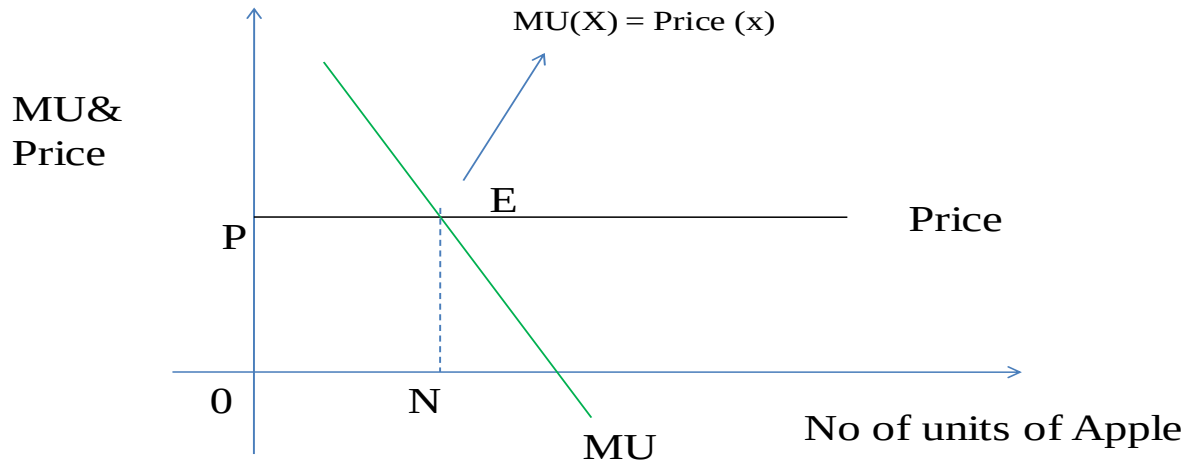
- Following schedule and diagram shows the consumer's equilibrium under the single commodity case.

Units of APPLE	Price	MU (Apple)	
1	4	10	MU(X)> P(X)
2	4	6	
3	4	4	Consumer's equilibrium point
4	4	2	MU(X) < Price (x)
5	4	0	
6	4	(-)2	

From the table we can see that by consuming 3rd unit consumer reaches the equilibrium, because at this situation condition of equilibrium is attained i.e. , MU (x) = Price (x)

Diagrammatic representation

Following diagram shows the determination consumer's equilibrium under the single commodity case.



By consuming 'ON' units of apple consumer reaches equilibrium, because the condition of equilibrium is fulfilled at this point.

Consumer's Equilibrium – Double commodities case

Under double commodity case a consumer reaches equilibrium when the following condition is achieved. That is:

$$\frac{MU(X)}{Price(X)} = \frac{MU(Y)}{Price\ (Y)}$$

On the basis of the following assumptions, we can explain the consumer's equilibrium under the double commodity case. They are:

Good x & good y are the two goods

Law of diminishing marginal utility is applicable in both the goods case.

Price = Rs. 1/unit (Good X, good Y)

Income = 5 rupee

With the help of the following table we can see the conditions of consumer's equilibrium

Qty. of goods	MU (X)	MU(Y)
1	20	12
2	16	10
3	10	6
4	3	3
5	2	1

From the above table we can see that by consuming 2 units of good 'x' and 3 units of good 'y' ,consumer reaches equilibrium, Because at this level condition of consumers equilibrium is achieved.

Indifference Curve Analysis

An Indifference curve is a combination of two goods, which gives the consumer same level of satisfaction. It is based upon the ordinal utility analysis. (Utility which can be ranked on the basis of preferences)

Properties of Indifference curve

i) Indifference curve Slope downwards from left to right.
Because, to obtain more quantity of one good, the consumer must give up some quantity of the other good in order to remain at the same utility level.
(ii) Strictly convex towards the origin.
Because of the diminishing Marginal Rate of Substitution (MRS) an indifference curve always become convex to the origin
(iii) It is based upon the diminishing Marginal Rate of Substitution (MRS). MRS falls because of the law of diminishing marginal utility.
(iv) It is based upon the ordinal utility analysis
(v) Higher Indifference curve represents higher level of satisfaction; Indifference map is based on monotonic preference of the consumer, a consumer always prefer a bundle which has more of at least one of the good and no less of the other good as compared to the other bundle.
(vi) TWO Indifference curves never intersect each other: As two indifference curves cannot represents the same level of satisfaction, they cannot intersect each other.

Indifference Schedule with MRS

An Indifference Schedule is a table showing different combinations of 2 goods such that utility from each combination is the same MRS is a rate at which the consumer is willing to sacrifice a good to Obtain one more unit of the other good.

combinations	Apple	Orange	MRS
A	1	15	----
B	2	10	5/1
C	3	6	4/1
D	4	3	3/1
E	5	1	2/1

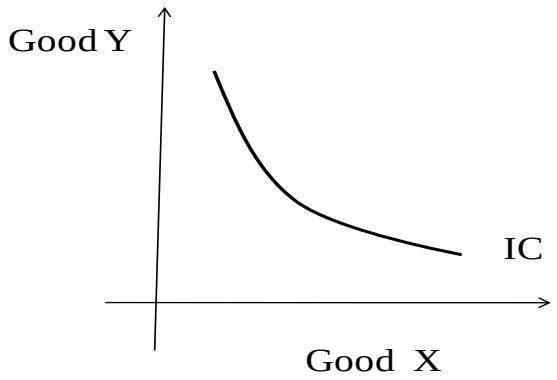
Indifference Curve:

The Indifference curve is the locus of different combinations of the two goods, that gives the consumer same level of satisfaction.

Indifference Curve

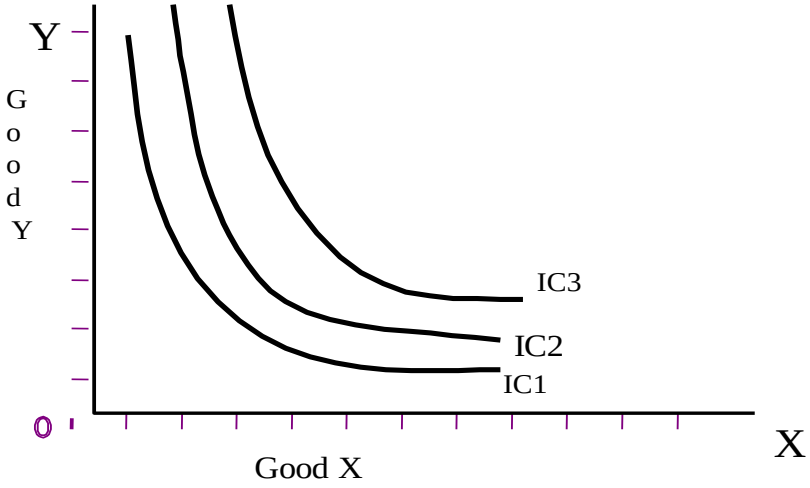
Indifference curve is a convex shaped curve slopes downward from left top to right bottom, as given below.

It is a convex shaped curve based upon the diminishing Marginal Rate of Substitution.



Indifference Map:- **Group of indifference curves together is known as indifference map. Each IC shows the different levels of satisfaction. The Indifference map is based on the assumption that the preferences are monotonic.**

Monotonic Preferences:-**A consumer always prefers the bundle which has more of at least one of the good and no less of the other good, as compared to the other bundle. A rational consumer always prefers more of a commodity as it offers him a higher level of satisfaction.**



BUDGET LINE

Budget line refers to the set of possible combinations of the two goods that a consumer can able to buy which will be equal to his money income.

P1 X1 + P2 X2 = Money

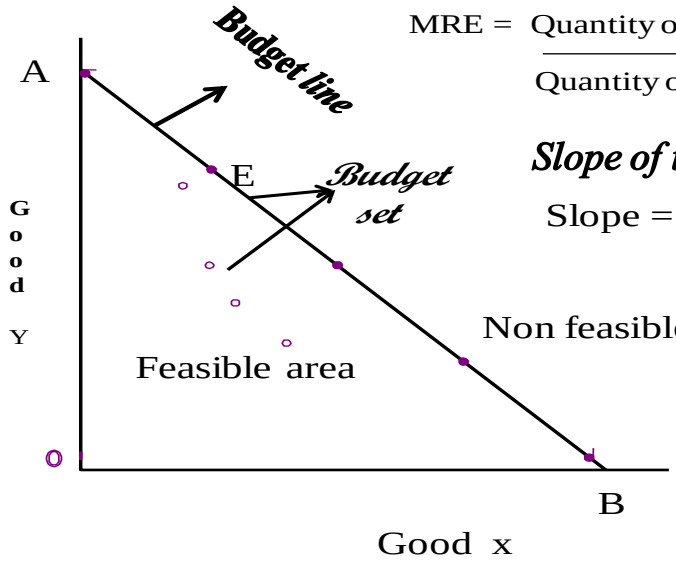
BUDGET SET

Budget set refers to all possible combinations of two goods that a consumer is able to purchase which will be less than or equal to money.

P1 X1 + P2 X2 ≤ Money

The rate at which, the market requires sacrifices of one good to obtain extra unit of the other good is called Market Rate of Exchange (MRE) .

Graphical presentation



MRE = $\frac{\text{Quantity of the good needed to be } \textbf{sacrificed}}{\text{Quantity of the good needed to be } \textbf{gained}}$

Slope of the Budget line

Slope = $\frac{\text{Qty of the good sacrificed}}{\text{Qty of the good obtained}}$

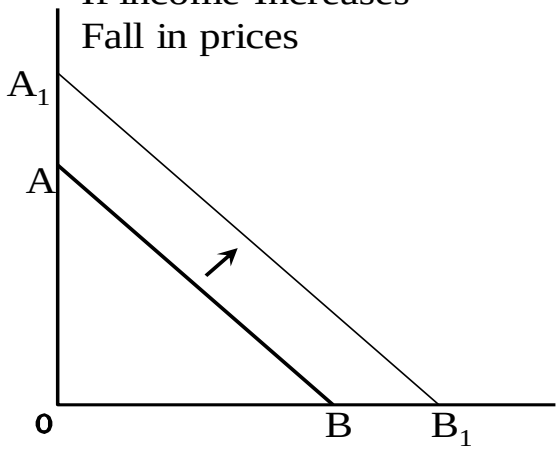
$= \frac{\triangle Y}{\triangle X} = Px / Py$

Shift in budget line

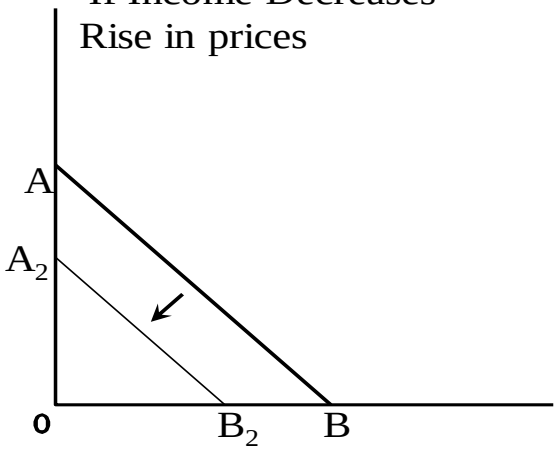
Budget line shifts because of the following changes.

(a)Change in the Income.

If income Increases
Fall in prices



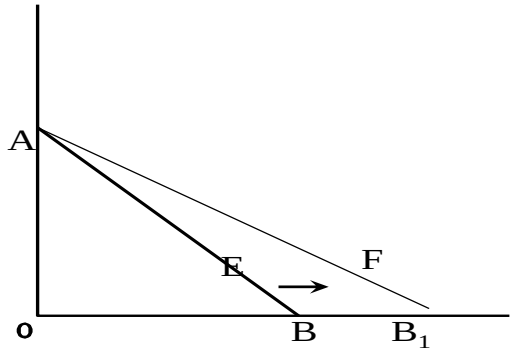
If Income Decreases
Rise in prices



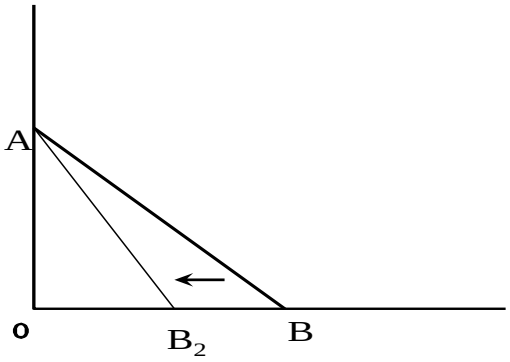
ROTATION OF BUDGET LINE in respect of Good 'X'

(b) Change in price of good X.

(i) If price of Good X falls .



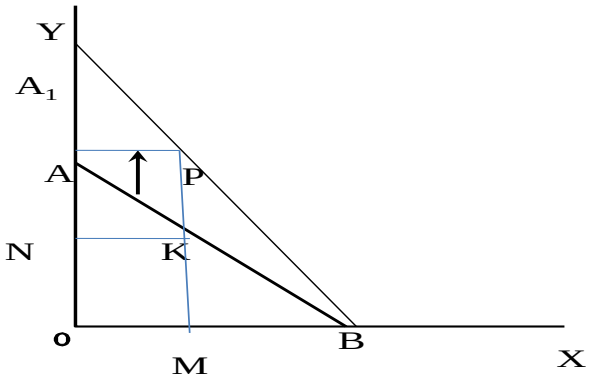
(ii) If price of Good X rises .



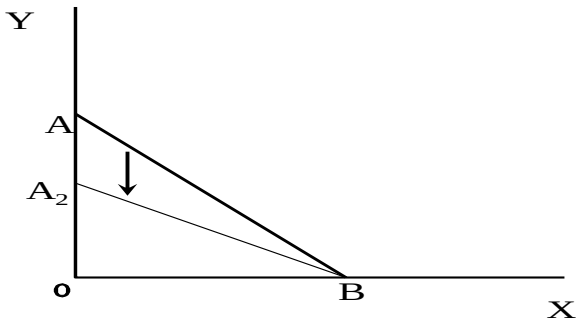
ROTATION OF BUDGET LINE in respect of Good 'Y'

(c) Change in the price of Good Y.

(i) If the price of Good Y falls .



(ii) If the price of Good Y rises



Consumer's Equilibrium Under Ordinal Utility Analysis (Hicksian Approach)

Consumer Equilibrium means the combination of two goods, which the consumer can afford and which gives maximum satisfaction he possibly can get. The point of maximum satisfaction is achieved by studying indifference map and budget line together. On an indifference map, higher indifference curve represents a higher level of satisfaction than any lower indifference curve. So subject to the consumer's budget constraint, a consumer always tries to remain at the highest possible indifference curve.

A Consumer reaches equilibrium at the point where the budget line is tangent to the highest Indifference curve.

Basic Assumptions are:

(a) The Consumer is rational.

(b) The Utility is expressed in ordinal terms.

(c) MRS decreases as more of one good is consumed by willingly sacrificing the other good.

(d) Law of Diminishing Marginal Utility is applicable.

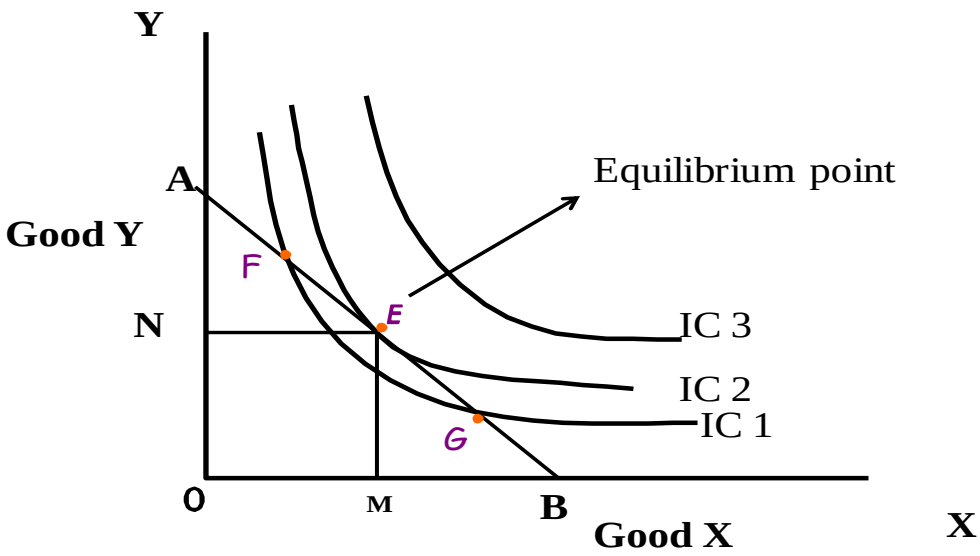
Basic condition for achieving consumer's equilibrium is:

i) The slope of IC is equal to the slope of Budget Line

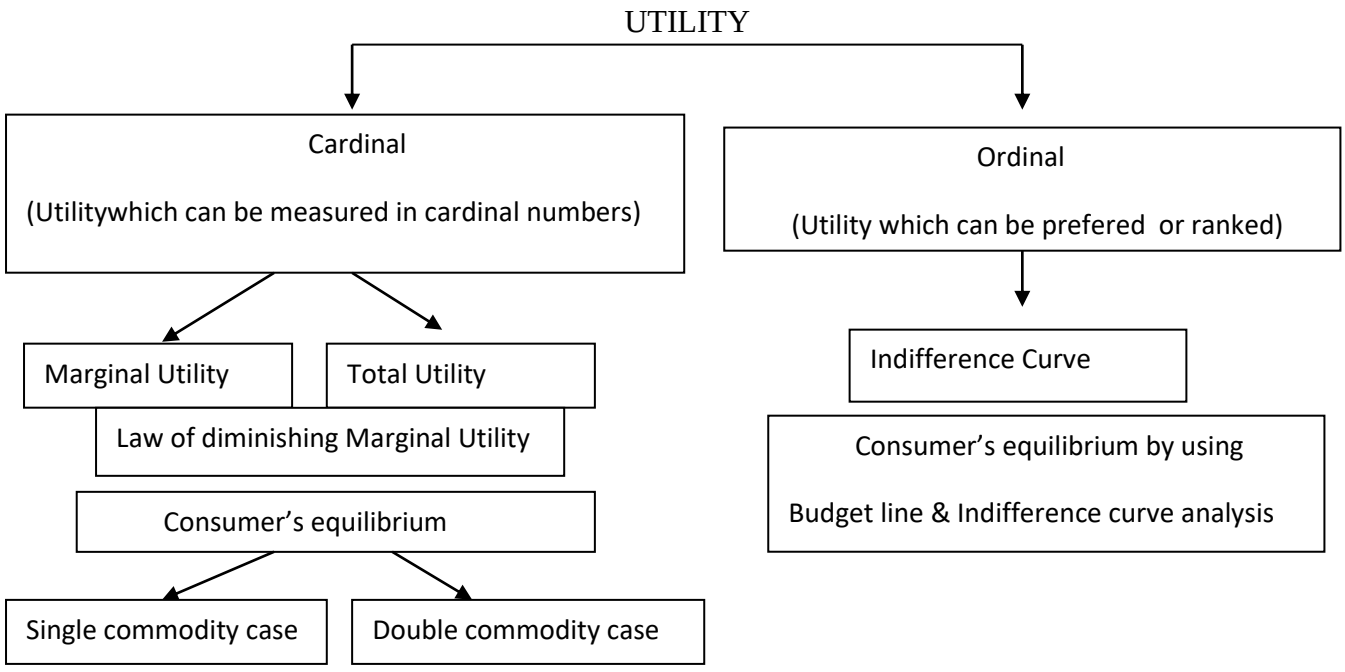
MRS (x, y) = Price(x) / price (y)

ii) MRS must be diminishing at the point of equilibrium

Graphical Presentation .



From the above diagram, we can see that consumer reaches equilibrium at point 'E', where the condition of equilibrium is achieved. He purchases 'OM 'units of good X and 'ON' units of good Y .The consumer will not like to purchase any other bundles on the budget lie AB , for example the bundles at F and G , because they lie on the lower indifference curve, and give him lower satisfaction.



IMPORTANT QUESTIONS

MULTIPLE CHOICE QUESTIONS:

1. Indifference curves are convex to the origin because of: a) Increasing MRS B) Diminishing MRS c) Law of Diminishing Marginal Utility d) None of these.
Ans: (b)

2. What happens to MU when TU reaches to its maximum? a) MU decreases b) MU increases c) MU become zero d) MU become negative.
Ans: (c)

3. Match the following

Column A	Column B
1. Zero Marginal utility	a. Gossen's first law of consumption
2. Law of Diminishing marginal utility	b. Price ratio
3.Marginal Rate of substitution	c. Point of satiety
4.Slope of budget line	d. Slope of indifference curve

Ans: 1 (c), 2 (a), 3 (d), 4 b)

4. If $MU_{x} / P_{X} > MU_{Y} / p_{Y}$, then to reach the equilibrium position, consumer should :
a) Buy more of good Y and less of good X b) Buy more of good X and less of good Y, c) Buy both in equal quantity, d) Stop buying good Y.
Ans: C

5. If MRS is constant throughout, the indifference curve will be: a) Downward sloping convex b) Upward sloping convex c) Downward sloping straight line d) Upward sloping
Ans: c

6. Under single commodity case a consumer reaches his equilibrium when the marginal utility from a commodity equal:
a) Demand for that commodity b) Price of that commodity c) Total utility d) None of these.
Ans: b

7. Under cardinal utility analysis, utility is measured in terms of: a) Rupees b) Preferences c) Utils d) Income
Ans: c

8. The points outside the budget line of two goods (Good X & Y) are: a) Unattainable points b) Unavailable points c) Attainable points d) None of these.
Ans: a

9. Find the missing figures and choose the correct alternative.

Units	1	2	3	4
TU	20	32	…(b)..	41
MU	20	…(a)…	7	(c)

Ans: (a) 12, (b)39, (c)2

10. Read the paragraph carefully and answer the given questions:

In economics, a consumer is an economic agent, who consumes a good or service for satisfaction of his wants. Every individual consumer is a rational consumer and understands his best interest. However, in certain circumstances, we can observe that people buy goods or services without their choice or needs, due to the influence of external factors. In such situations utility is derived by mere purchase of goods and not from its consumption. Such buying we could see during the festive seasons.

11. Which of the following statement is / are true for utility?
a) Utility depends on wants and needs.
b) Utility is the want satisfying power of a commodity.
c) Same good may give different utility in different situations.
d) All of these.

Ans: d

12. Rationality of a consumer depends upon which of the following factor.
a) Utility from the consumption of a good
b) Consumer's taste and preferences
c) Based upon the habit of a consumer.
d) All of the above.

Ans: a

13. In case of two goods the condition of consumer equilibrium is: (choose the correct alternative)
(a) MUx.Px = MUy.Py (b) MUx/Px = MUy/Py
(c) MUx. MUy. = Px. Py (d) MUx Py/ MUy Px
Ans: b

14. Read the following statements carefully and choose the correct alternative from the following.
Statement 1: Bundles which cost more than consumer's money income lies outside the budget line.
Statement 2: Budget set is a narrower concept than budget line.
(a) Both statements are true
(b) Both statements are false
(c) Statement 1 is true and statement 2 is false
(d) Statement 1 is false and statement 2 is true
Ans: c

15. Read the following statements carefully and choose the correct alternative from the following.
Statement 1: When consumption increases beyond the point of satiety, total utility starts rising.
Statement 2: MU reaches its maximum at the point of satiety
(a) Both statements are true
(b) Both statements are false
(c) Statement 1 is true and statement 2 is false
(d) Statement 1 is false and statement 2 is true.
Ans: b

16. Read the following statements carefully and choose the correct alternative from the following.
Statement 1: Indifference map is a set of indifference curves representing different levels of satisfaction.
Statement 2: Total utility initially increasing at an increasing rate.

(a) Both statements are true
(b) Both statements are false
(c) Statement 1 is true and statement 2 is false
(d) Statement 1 is false and statement 2 is true.
Ans: c

17. Read the following statements carefully and choose the correct alternative from the following.
Statement 1: Law of diminishing marginal utility doesn't hold true in absence of continuous consumption.
Statement 2: A consumer consumes one good and is in equilibrium. He will get more utility when the price of the good falls.
(a) Both statements are true
(b) Both statements are false
(c) Statement 1 is true and statement 2 is false
(d) Statement 1 is false and statement 2 is true.
Ans: a

18. Read the following statements carefully and choose the correct alternative from the following.
Statement 1: According to cardinal utility approach, utility can be numerically estimated, which a person derives from consumption of goods and services.
Statement 2: Utility is subjective and it varies from person to person.
(a) Both statements are true
(b) Both statements are false
(c) Statement 1 is true and statement 2 is false
(d) Statement 1 is false and statement 2 is true.
Ans: a

19. Read the following assertion and reason carefully and choose the correct alternative from the following
Assertion (A): An indifference curve is always convex to the origin.
Reason (R: MRS always diminishes because of the law of diminishing marginal utility.
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but the Reason (R) is false.
(d) Assertion (A) is false but the Reason (R) is true.
Ans: a

20. Read the following assertion and reason carefully and choose the correct alternative from the following.
Assertion (A): A consumer always prefer a combination lies on the higher indifference curve.
Reason (R: Higher IC shows higher levels of satisfaction
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but the Reason (R) is false.
(d) Assertion (A) is false but the Reason (R) is true.
Ans: a

21. Read the following assertion and reason carefully and choose the correct alternative from the following.
Assertion (A): Different persons derive different levels of utility from consumption of similar types of commodities.
Reason (R: The want satisfying power of any commodity is known as utility, which is measured in utils under cardinal utility.
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but the Reason (R) is false.
(d) Assertion (A) is false but the Reason (R) is true.

Ans: b

22. Read the following assertion and reason carefully and choose the correct alternative from the following
Assertion (A): The indifference curve slopes downwards.
Reason (R): In order to consume more units of one good, some units of the other good have to be sacrificed.
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but the Reason (R) is false.
(d) Assertion (A) is false but the Reason (R) is true.
Ans: a

23. Read the paragraph carefully and answer the given questions:

A rational consumer whose main aim is to maximize his satisfaction always tries to reach at the point of equilibrium. Equilibrium means a state of balance and is the term that used often in studying consumer behavior. When a consumer is consuming single commodity and has to pay a price for the commodity then he has to equate price and marginal utility derived from the consumption of the commodity so as to reach the point of equilibrium

1. Additional utility derived from the consumption of one more unit of the given good is known as…….
Ans: Marginal utility
2. By consuming a single commodity a rational consumer always equate its marginal utility with ……. .of that commodity.
Ans: Price
3. Utility is measured in terms of ……..
Ans: Utils.

SHORT ANSWER QUESTIONS

1. Define marginal utility and prepare a marginal utility schedule.

Ans: Additional utility obtained by consuming one more unit of the given good

No. of unit consumed (X)	1	2	3	4	5	6	7	
MU (X)	10	7	5	3	1	0	(-)1	

2. Define indifference curve. Write its major properties.
Ans; Indifference curve is the combination of two goods which gives the consumer the same level of satisfaction.
Refer topic IC and its properties.

3. Write the major relationship between MU and TU
Ans: (Refer previous page for schedule and diagram)
1. When MU falls and is positive, TU rises
2. When MU become zero, TU reaches its maximum,
3. When become negative, TU falls.

4. Discuss the meaning of budget line with a hypothetical schedule and diagram.
Ans: (Refer budget line and see the schedule and diagram)

5. Ravi consumes orange and he wants to get maximum satisfaction. Explain how he reaches equilibrium. Use a hypothetical schedule.

Ans: Refer consumer's equilibrium under single commodity case

6. Explain the law of diminishing marginal utility with the help of a schedule and diagram.
Ans: Refer the law of diminishing marginal utility

7. Out of budget line and budget set, which one is relevant for determining consumer's equilibrium?
Ans: Budget line is relevant for determining consumer's equilibrium because of the assumption that consumer spends the entire income, so equilibrium bundle must lies on the budget line only.

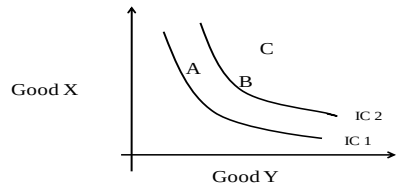
8. What will happen to the budget line if income of the consumer rises?
Ans: Either budget line will shift to its right side or rotate in favor to good X or Good Y.

9. What do you mean by indifference map? Show diagrammatically.
Ans. Refer IC map and the diagram given above in the gist of the chapter.

10. Define monotonic preference.
Ans: Indifference map is based on monotonic preference of the consumer, a consumer always prefer a bundle which has more of at least one of the good and no less of the other good as compared to the other bundle.

LONG ANSWER QUESTIONS:

1. Read the following diagram carefully and answer the given questions.



1. In the above given indifference curves IC_1 and IC_2, which indifference curve will be preferred by the consumer and why?
2. Whether consumer is able to purchase the combination indicated at point C? If so why?
3. Out of the given points A and B, which point will be preferred by the consumer? Why?

Ans: 1. Consumer will prefer IC_2, because consumer will get more satisfaction from IC_2 than IC_1.
2. No, because it lies in the no feasible area.
3. Consumer prefers point B, because consumer will get more satisfaction from higher indifference curve.

2. Explain consumer's equilibrium by using the budget line and indifference curve analysis. Use diagram.
Ans. Refer consumer's equilibrium under ordinal utility analysis with diagram.

3. Explain consumer's equilibrium in the case of double commodities under cardinal utility analysis. Use schedule.
Ans.: Refer cardinal utility-- double commodity consumer's equilibrium and its schedule.

4. A consumer consumes only two goods, good X and good Y. Suppose Marginal utility obtained from good X is more than that of the good Y, how can he reach equilibrium?
Ans.: Hint
Condition of consumer's equilibrium under double commodity case is

$$\frac{MU(X)}{Price(X)} = \frac{MU(Y)}{Price\ (Y)}$$

Here $MU_X > MU_Y$ so consumer should purchase more of good X. As he consumes more of good X he has to reduce the consumption of good Y. This process will continue till the condition is achieved.

5. Explain the following:
a) Movement along the same indifference curve
b) Shift from lower to a higher indifference curve.

Ans: a) While moving from one combination to another combination on the same IC, consumer has to sacrifice some units of one commodity to gain another unit of the given good. But the level of satisfaction will remain the same.

b) While shifting from lower IC to higher IC the level of satisfaction will be increased, as higher IC gives higher satisfaction (Monotonic preferences).

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

CONCEPT OF DEMAND

Demand, market demand, determinants of demand, demand schedule, demand curve and its slope, movement along and shifts in the demand curve; price elasticity of demand - factors affecting price elasticity of demand; measurement of price elasticity of demand – percentage-change method and total expenditure method.

DEMAND

- **Individual Demand** refers to the quantity of a commodity that a consumer is willing and able to buy, at each possible price during a given period of time.

- **Market Demand** refers to the quantity of a commodity that all consumers are willing and able to buy, at each possible price during a given period of time.

Demand function / Determinants of Individual Demand

Demand function shows the relationship between quantity demand for a particular community and factors influencing it.

Individual Demand function

Individual demand functions refers to the functional relationship between individual demand and the factors affecting individual demand

$\mathbf{D_x} = f(Px, P_r, Y, T)$

1. **Own Price of the Commodity (P_x)**: Generally, there exists an inverse relationship between price and quantity demanded. Other things being equal, with rise in price of a commodity, its demand contracts and with fall in its own price, the demand extends.
2. **Price of Related Goods (P_r) :**
   Related goods are of two types:
   (a) Substitute Goods:

- These goods can be used in place of one another like tea and coffee.
- An increase in the price of the substitute leads to an increase in the demand for given commodity and vice-versa.
- Demand for a given commodity directly affected by change in price of substitute goods.

(b) Complementary Goods:

- These goods are used together to satisfy a particular want like tea and sugar.
- An increase in the price of complementary good leads to decreases in the demand for given commodity and vice versa.
- Demand for a given commodity is inversely affected by change in price of complementary goods.

(3) Income of the consumer (Y):

The effect of change in income on demand depends on the nature of the commodity

- If the given commodity is a **normal good** then and increase income leads to rise in its demand while decrease in income reduces demand
- If the given commodity is an **inferior good** then and increase in the income reduces the demand while decrease in income leads to rise in demand.

(4) Tastes and Preferences (T):

- Taste and preferences includes changes in fashion, customs, habits etc.
- If a commodity is in fashion or is preferred by the consumer then demand for such a commodity rises otherwise; the demand for that commodity falls.

Demand Schedule

Demand schedule is a tabular statement showing the relationship between price of a commodity and its quantity demanded. Demand schedule is of two types:

(1) Individual Demand Schedule (2) Market Demand Schedule

- **Individual Demand Schedule**: It is a tabular statement showing various quantities of a commodity that a consumer is willing to buy at various levels of price during a given period of time.

INDIVIDUAL DEMAND SCHEDULE

Price (in ₹)	Quantity Demanded
5	10
4	20
3	30
2	40
1	50

- **Market Demand Schedule**: It is a tabular statement showing various quantities of a commodity that all the consumers are willing to buy at various levels of price during a given period of time.

MARKET DEMAND SCHEDULE

Price (in ₹)	Individual Demand		Market Demand ($D_x + D_Y$)
	House hold X (D_x)	Household Y (D_Y)	
5	10	20	10+20=30
4	20	30	20+30=50
3	30	40	30+40=70
2	40	50	40+50=90
1	50	60	50+60=110

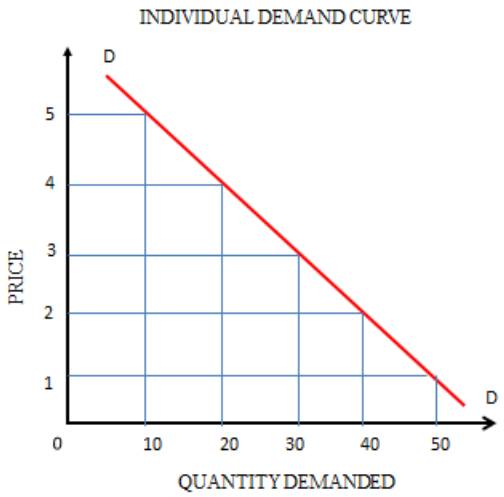
DEMAND CURVE

- Demand curve is a graphical representation of demand schedule.
- It is the locus of all the points showing various quantities of a commodity that a consumer is willing to buy at various levels of price, during a given period of time, assuming no change in other factors.
- It shows the inverse relationship between the quantities demanded of a commodity with its price.

Demand curve is of two types:
(1) Individual Demand curve (2) Market Demand Curve

Individual Demand Curve

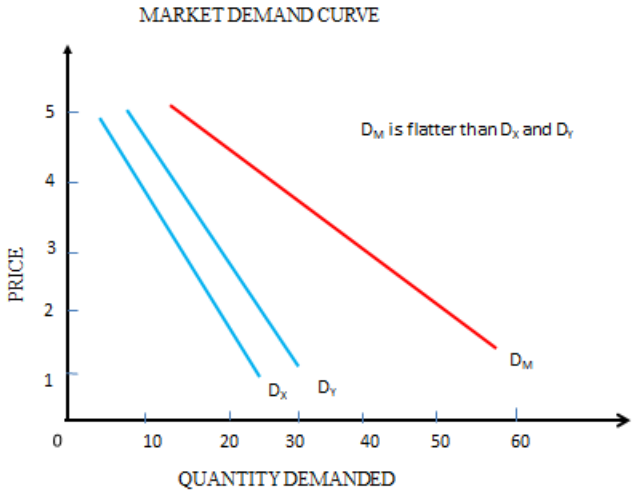
It refers to a graphical representation of individual demand schedule.



The Demand curve "DD" slopes downwards due to inverse relationship between price and quantity demanded

- **Market Demand Curve**

- It refers to a graphical representation of market demand schedule.
- Market Demand Curve (D_M) is obtained by horizontal summation of individual demand curves (D_X) and (D_Y)

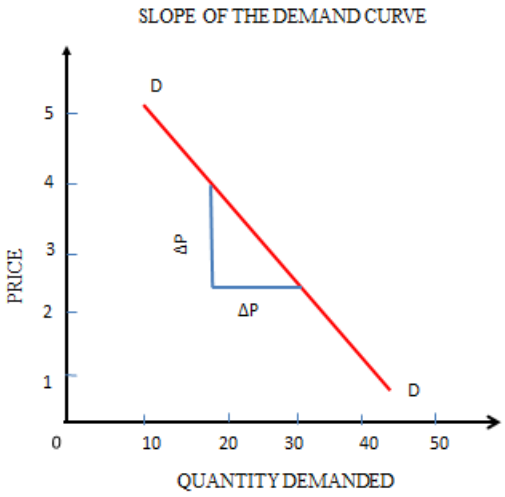


Slope of Demand Curve

It is defined as the change in the variable on the Y – axis divided by the change in the variable on the X- axis.

$$\text{Slope of Demand Curve} = \frac{\text{Change in Price } (\Delta P)}{\text{Change in Quantity } (\Delta Q)}$$

- Due to inverse relationship between price and demand, the demand curve slopes downwards, So slope is Negative
- Slope of the demand curve measures the flatness and steepness of the demand curve. So it is based on the absolute change in price and quantity.

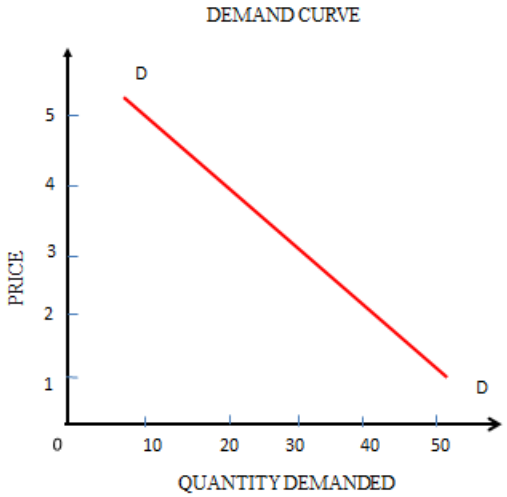


LAW OF DEMAND

Law of demand state the inverse relationship between price and quantity demanded keeping other factors constant (ceteris paribus). Keeping other factors constant or (ceteris paribus) is used to cover the following assumptions on which the law is based:

1. Prices of substitute goods do not change

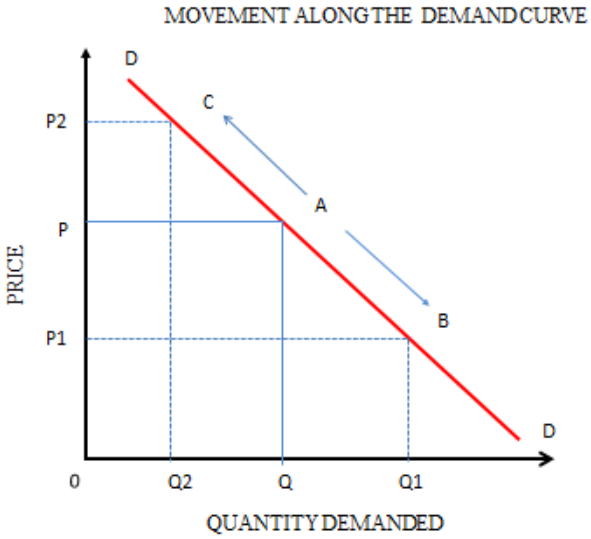
2. Prices of complementary goods remain constant
3. Income of the consumer remains the same
4. Taste and preferences of the consumer remains the same



Demand Curve DD slopes downwards from left to right, indicating an inverse relationship between price and quantity demanded.

Movement along the Demand Curve / Change in Quantity Demanded

- When quantity demanded of a commodity changes due to change in its price, keeping other factors constant, it is known as change in quantity demanded.
- It is graphically expressed as a movement along the same demand curve.
- There can be either downward movement (expansion in demand) or an upward movement (contraction in demand) along the same demand curve.



Upward Movement: When price rises to OP2 quantity demanded falls to OQ2 (known as Contraction in demand), leading to an upward movement from A to C along the same demand curve DD

Downward moment: On the other hand, fall in price from OP to OP1 leads to an increase in quantity demanded from OQ to OQ1 (known as expansion in demand) resulting in a downward movement from A to B along the same demand curve DD

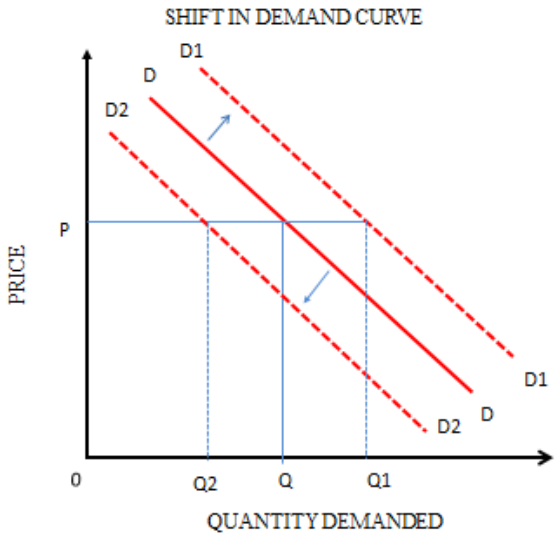
SHIFT IN DEMAND CURVE / CHANGE IN DEMAND

When the demand of a commodity changes due to change in any factor other than the own price of the commodity, it is known as a change in demand. It is expressed as a shift in the demand curve

Various reasons for shift in demand curve:

1. Change in Price of substitute / Complimentary good
2. Change in income of the consumer
3. Change in tastes and preferences

- **Increase in demand (Rightward shift)**: When demand rises from OQ to OQ1 due to favourable changes in other factors at the same price of OP, leads to a right word shift in demand curve from DD to D1D1
- **Decrease in demand (Leftward shift)**: When demand falls from OQ to OQ2 due to unfavourable changes in other factors at the same price of OP, leads to a leftward shift in demand curve from DD to D2D2



PRICE ELASTICITY OF DEMAND

Price elasticity of demand means the degree of responsiveness of demand for a commodity with reference to change in price of the commodity

FACTORS AFFECTING PRICE ELASTICITY OF DEMAND

1. Nature of commodity: A commodity for a person maybe a necessity, a comfort or a luxury.

- Necessity commodity: Demand for food grains vegetables and medicines etc. is generally inelastic as it is required for human survival its demand does not fluctuate much with the change in price.
- Comfort commodity: Demand for fan, refrigerator etc. is generally elastic, as consumer can postpone its consumption.
- Luxury commodity: Demand for AC, luxury vehicles etc. is more elastic as compared to demand for comfort.

2. Availability of substitutes: Demand for a commodity with the large number of substitutes will be more elastic because even small rice in its price will induce the buyers to go for its substitutes.

3. Income level: Elasticity of demand for any commodity is generally less for higher income level groups in comparison to people with low income because rich people are not influenced that much by changes in the price of goods

4. Postponement of consumption: The commodities whose consumption is not urgent have highly elastic demand as their consumption can be postponed in case of an increase in their prices

5. Number of uses: If the commodity under consideration has several uses then its demand will be elastic

6. Share in Total Expenditure: Greater the proportion of income spent on a commodity, more is the elasticity of demand for it and vice versa.

MEASUREMENT OF PRICE ELASTICITY OF DEMAND

- PERCENTAGE / PROPORTIONATE METHOD OF MEASURING PRICE ELASTICITY OF DEMAND

According to this method, elasticity is measured as the ratio of percentage change in quantity demanded to percentage change in price

$$\text{Elasticity of Demand } (E_d) = \frac{\text{Percentage Change in Quantity demanded}}{\text{Percentage Change in Price } (\Delta P)}$$

$$\text{Percentage change in Qty. Dd.} = \frac{\text{Change in Quantity demanded } (\Delta Q)}{\text{Initial Quantity } (Q)} * 100$$

$$\text{Change in Qty. } (\Delta Q) = Q1 - Q$$

$$\text{Percentage change in Price} = \frac{\text{Change in Quantity Price } (\Delta P)}{\text{Original Price } (P)} * 100$$

Change in Price (ΔP) = P1 - P

$$E_d = \frac{\Delta Q}{\Delta P} * \frac{P}{Q}$$

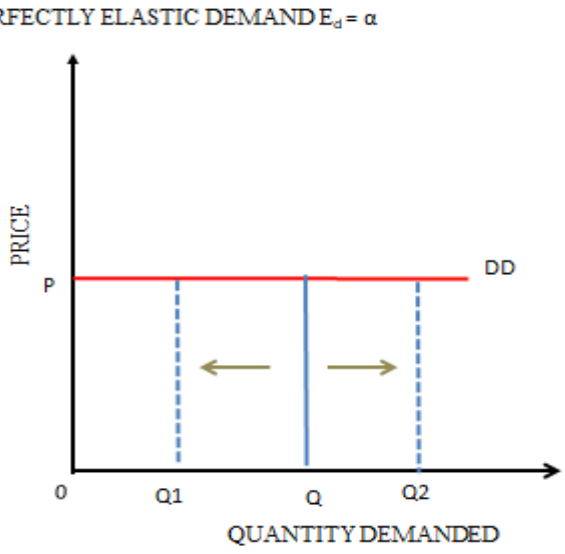
DEGREES OF ELASTICITIES OF DEMAND

- Degree of responsiveness of quantity demanded to a change in price may differ and hence elasticity of demand could also differ.
- Price elasticity of demand can be expressed in terms of numerical value, which arranges from zero to Infinity

Kinds of Price Elasticity

1. Perfectly Elastic Demand (Ed= ∞):
   - When there is an infinite demand at a particular price and demand becomes zero with a slight rise in the price then demand for such a commodity is said to be perfectly elastic
   - Ed is equal to infinity and demand cure DD is a horizontal straight line parallel to x-axis

PRICE	DEMAND
10	100
10	200
10	300

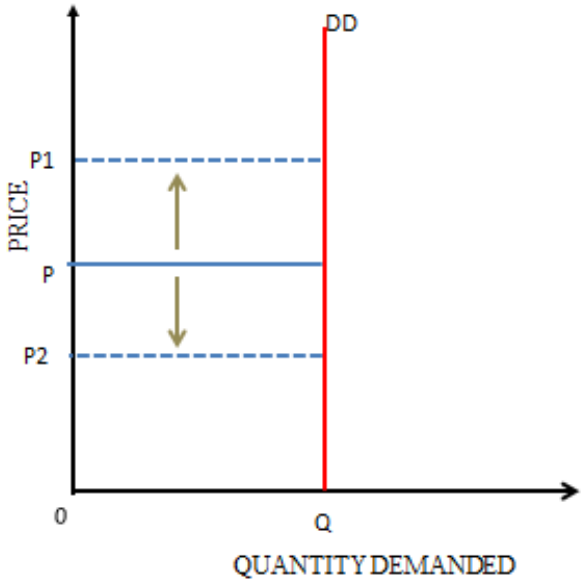


2. Perfectly Inelastic Demand: (Ed=0)

- When there is no change in demand with change in price then demand for such a commodity is said to be perfectly inelastic
- Ed is equal to zero and demand cure DD is a vertical straight line parallel to Y-axis

PERFECTLY INELASTIC DEMAND $E_d = 0$

PRICE	DEMAND
10	100
20	100
30	100

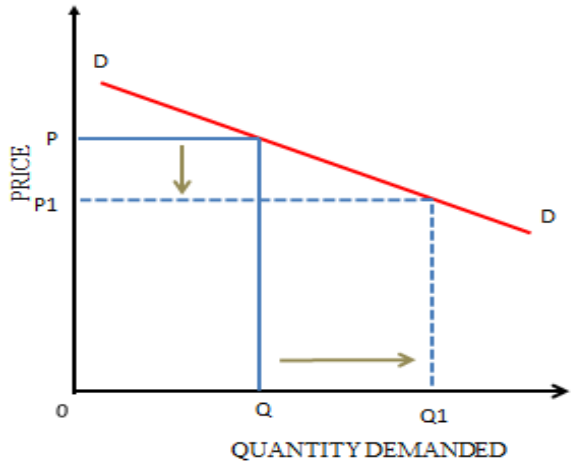


3. Highly Elastic Demand: (Ed>1)

- When Percentage change in Quantity demanded is more than Percentage change in Price then, demand for such a commodity is said to be highly elastic
- In such a case Ed > 1.
- Highly elastic demand curve is flatter and its slope is inclined more towards x axis

HIGHLY ELASTIC DEMAND $E_d > 1$

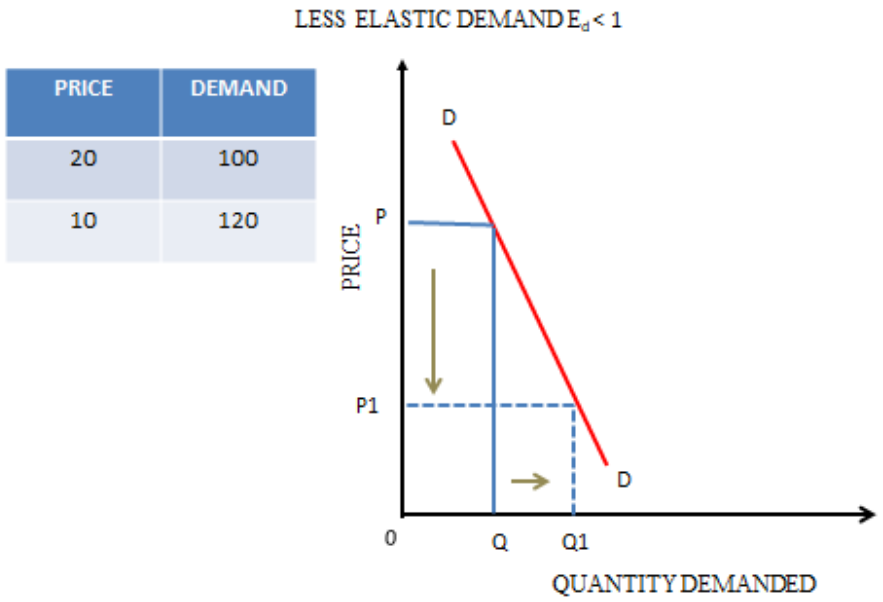
PRICE	DEMAND
20	100
10	200



4. Less Elastic Demand

- When percentage change in the quantity demanded is less than the Percentage change in price then demand for such a commodity is said to be less elastic or inelastic
- In such a case Ed < 1
- The less elastic demand curve is steeper and it's a slope is inclined more towards y axis

PRICE	DEMAND
20	100
10	120



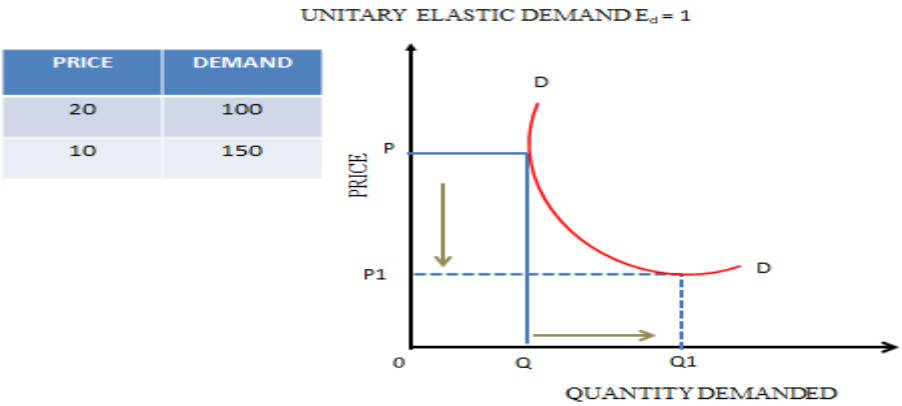
5. Unitary elastic demand:

When percentage change in the quantity demanded is equal to percentage change in price, then demand for such a commodity is said to be unitary elastic.

In this case Ed = 1 and

The demand curve is a rectangular hyperbola

PRICE	DEMAND
20	100
10	150



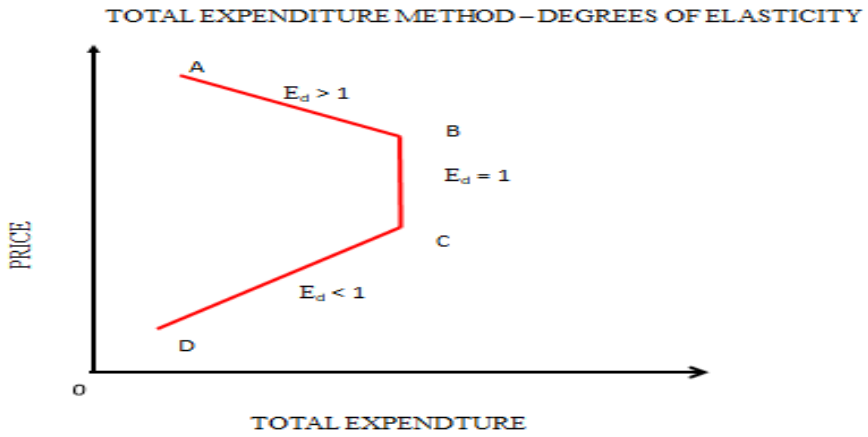
- TOTAL EXPENDITURE METHOD OF MEASURING PRICE ELASTICITY OF DEMAND

In this method, amount of change and direction of change in total expenditure are determined as a result of change in price of commodity.

Total expenditure = Price x Quantity demanded

Only three degrees of the elasticity of demand can be calculated by this method.
I. Equal to unit Elasticity – When total expenditure remains constant due to increase or decrease in price, elasticity of demand is equal to unity.
II. Greater than Unit Elasticity – When total expenditure increases due to decrease in price or total expenditure decreases due to increase in price, elasticity of demand is greater that unity.

II. Less Than Unit Elasticity – When total expenditure decreases due to decrease in price or total expenditure increases due to increase in price, elasticity of demand is less than unity.



QUESTION & ANSWERS

MULTIPLE CHOICE QUESTION & ANSWERS

1. Law of demand states the ---------- relationship between price and quantity demanded'

(a) Inverse (b) Positive (c) Proportional (d) None of the Above

2. Demand of a commodity depends upon --------
(a) Price (b) Income (c) Price of related good (d) All of the above

3. If demand curve is parallel to x-axis, what will be the nature of elasticity?
(a) Perfectly elastic (b) Inelastic (c) Elastic (d) Highly elastic

4. In which of the following cases will the Price elasticity of demand is less elastic?
   (a) Goods which can put to multiple use
   (b) Goods on which the consumers will spend small proportion of their income
   (c) Goods whose consumption can be postponed
   (d) None of the above
5. When total expenditure increases in response to decrease in own price of the commodity, the elasticity of demand is:
   (a) Inelastic (b) elastic (c) perfectly elastic (d) perfectly inelastic
6. Using Total Expenditure method, find Ed, when price and demand are under:

Price	Demand
10	40
15	20

   (a) Ed=1 (b) Ed= 0 (c) Ed>1 (d) Ed<1

Answers

1. (a) 2. (d) 3. (a) 4. (b) 5. (b) 6. (c)

CHOOSE THE CORRECT ALTERNATIVE

Alternatives:

(a) Both the statements are true
(b) Both the statements are false
(c) Statement 1 is true and Statement 2 is false
(d) Statement 2 is true and Statement 1 is false

1. Statement I: On every point on the straight – line demand curve, the point elasticity is all equal

   Statement II: On every point on the rectangular hyperbola shaped demand curve, the point elasticity is not Equal

Ans: Both the above statements are false

Explanation: The slope of straight line demand curve one with a constant slope has constantly changing elasticity. It includes all five elasticity alternatives, No two points on a straight line demand curve have the same elasticity.

2 .Statement 1: availability of substitutes makes demand less elastic

Statement II: Substitute goods have less elastic in demand.

Ans: (b) Both the statements are false

3. Statement 1: If a good can be used for many purposes the demand for it will be elastic

Statement II: elasticity of demand is low in case of low price goods

Ans: (a) Both the statements are true

4. Statement 1: Slope of the demand curve and the elasticity of demand are different concepts

Statement 1I: Slope of a demand curve is equal to $\Delta P / \Delta Q$

Ans: (b) Both the statements are false

5. Statement 1: Change in quantity demanded is the explanation of law of demand

Statement II: demand for a luxury good is elastic

Ans: (d) Statement 2 is true and Statement 1 is false

ASSERTION-REASON QUESTIONS

Read the following statements: Assertion (A) and Reason (R). Choose one of the correct alternatives given below:
a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
c) Assertion (A) is true but Reason (R) is False
d) Assertion (A) is False but Reason (R) is True

1. Assertion (A): Change in quantity demanded of one commodity due to a change in the price of other commodity is cross demand.
   Reason (R): Changes in consumer income leads to a change in demand.

Ans: (b)

2. Assertion (A): Demand for durable goods has higher elasticity of demand.
   Reason (R): Demand for durable goods can be postponed once they are demanded at present.

Ans: (a)

3. Assertion (A): Complementary goods have joint demand.
   Reason (R): Complementary goods are demanded simultaneously to satisfy a particular want.

Ans: (a)

4. Assertion (A): Price demand curve is negatively slowed
   Reason (R): law of demand States inverse relation between price and demand. keeping other factors constant.

Ans: (a)

5. Assertion (A): The demand curve is downward sloping as a consumer is willing to pay lesser and lesser for each additional unit consumed as he/she gets lesser utility for each additional unit consumed.

   Reason (R): With a fall in the price of a good, consumers' purchasing power increases. So, he/she consumes more units

Ans: (b)

MATCHING THE CORRECT STATEMENT

From the set of statements given in column I and column II choose the correct pair of statement.

Column I	Column II
A. Demand	(i) Specific quantity to be purchased against a specific price of the commodity
B. Substitute goods	(ii) Bread and Butter
C. Normal goods	(iii)Income effect is negative
D. Increase in Demand	(iv) More of a commodity is purchased at its existing price

Alternatives:

(a)A – (i) (b) B – (ii) (c) C – (iii) (d) D – (iv)

Ans: (d)

Column I		Column II
A.	Rightward shift of Demand Curve	(i) Decrease in Price of Substitute good
B.	Leftward shift of Demand Curve	(ii) Decrease in income
C.	Contraction of Demand	(iii) Decrease in price
D.	Extension of Demand	(iv) Increase in Price

Alternatives:

(a) A – (i) (b) B – (ii) C – (iii) D – (iv)

Ans: (b)

CASE STUDY QUESTIONS

Read the given cases carefully and answer the question on the basis of the same

"India wheat prices jump to 6-month high on demand, limited supply" – "The Economic Times" 8 August 2023

Indian wheat prices surged to a six-month high on Tuesday due to limited supplies and robust demand ahead of the festival season, dealers said. Rising wheat prices could contribute to food inflation and potentially complicate the efforts of both the government and the central bank to contain inflation.

1. What is meant by extension of demand?
   (a) Quantity demanded of commodity decreases due to increase in own price
   (b) Increase in demand
   (c) Increase in Quantity demanded
   (d) Bothe (a) and (c)
2. Certain goods which are demanded only because of their prices are very high are called:
   (a) Luxury goods (b) articles of distinction (c) inferior goods (d) Both (a) and (b)
3. Statement I: The slope of demand curve for a normal good is downward sloping
   Statement I: Increase in the price of bread will also increase the demand for butter.
   Alternatives:
   (a) Both the statements are true
   (b) Both the statements are false
   (c) Statement 1 is true and Statement 2 is false
   (d) Statement 2 is true and Statement 1 is false

4. Which of the following statement is “FALSE”?

(a) Increase in quantity demanded is a situation of extension of demand
(b) Change in demand is indicated by movement along the demand curve
(c) Rise in price of substitute good leads to increase in its own demand
(e) Demand curve is drawn on the assumption that except price, all other determinants of demand remain constant.

Answers:

1. (d) 2. (d) 3. (a) 4 (b)

SHORT ANSWER QUESTIONS (3/4 MARKS)

1. Give any three situations when demand curve shifts forward?
   Hint:
   (a) When income of the consumer increases
   (b) When price of substitute good increases
   (c) When price of complementary good falls
2. What is the relation between Good X and Good Y, if with rise in the price of Good X, demand for Good Y rises?
   Hint: Substitute goods (Explain)

3. The following news was printed in the Economic Times
   Petrol and Diesel prices were cut by 2 per litre as international oil prices slumped into a 5-year low"
   Use a diagram and economic theory to analyze the impact on the demand for cars in India

   Hint: Right ward shift of demand curve (use diagram and explain)

LONG ANSWER QUESTIONS

1. How is demand for a commodity affected by changes in the price of related good. Explain with the help of diagram?

Ref: content given above

2. Explain with the help of diagram the effect of following changes on the demand for a commodity?
   (a) fall in income of its buyers (b) a rise in the price of substitute good.

Ref: content given above

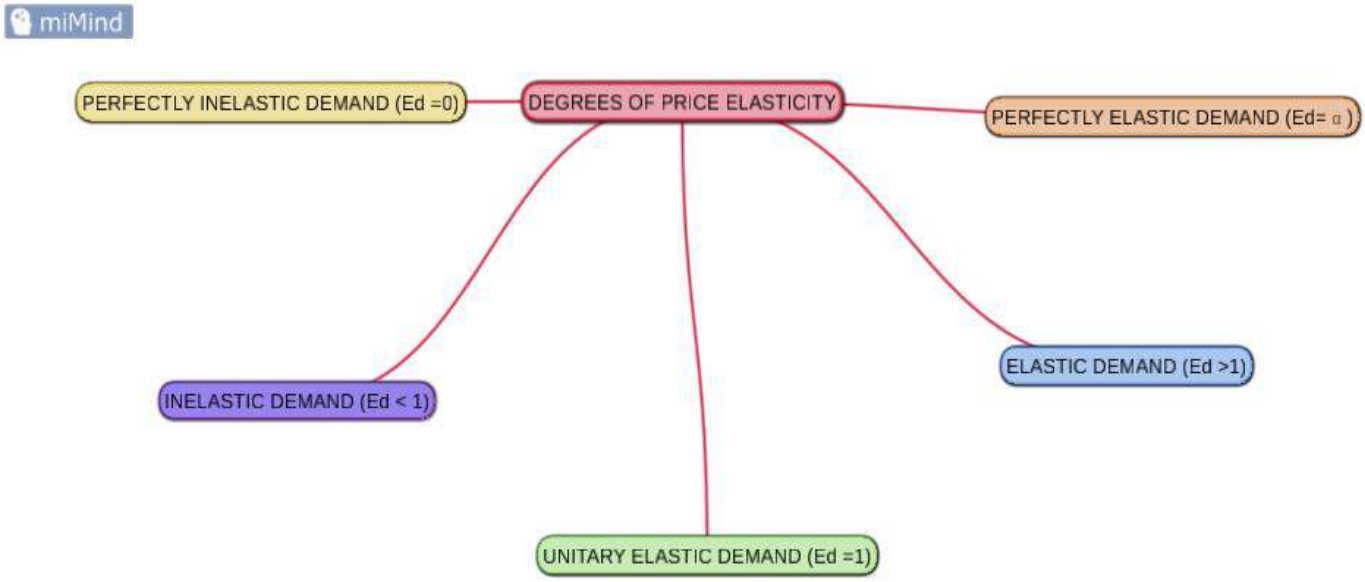
3. What are the factors effecting the price elasticity of demand

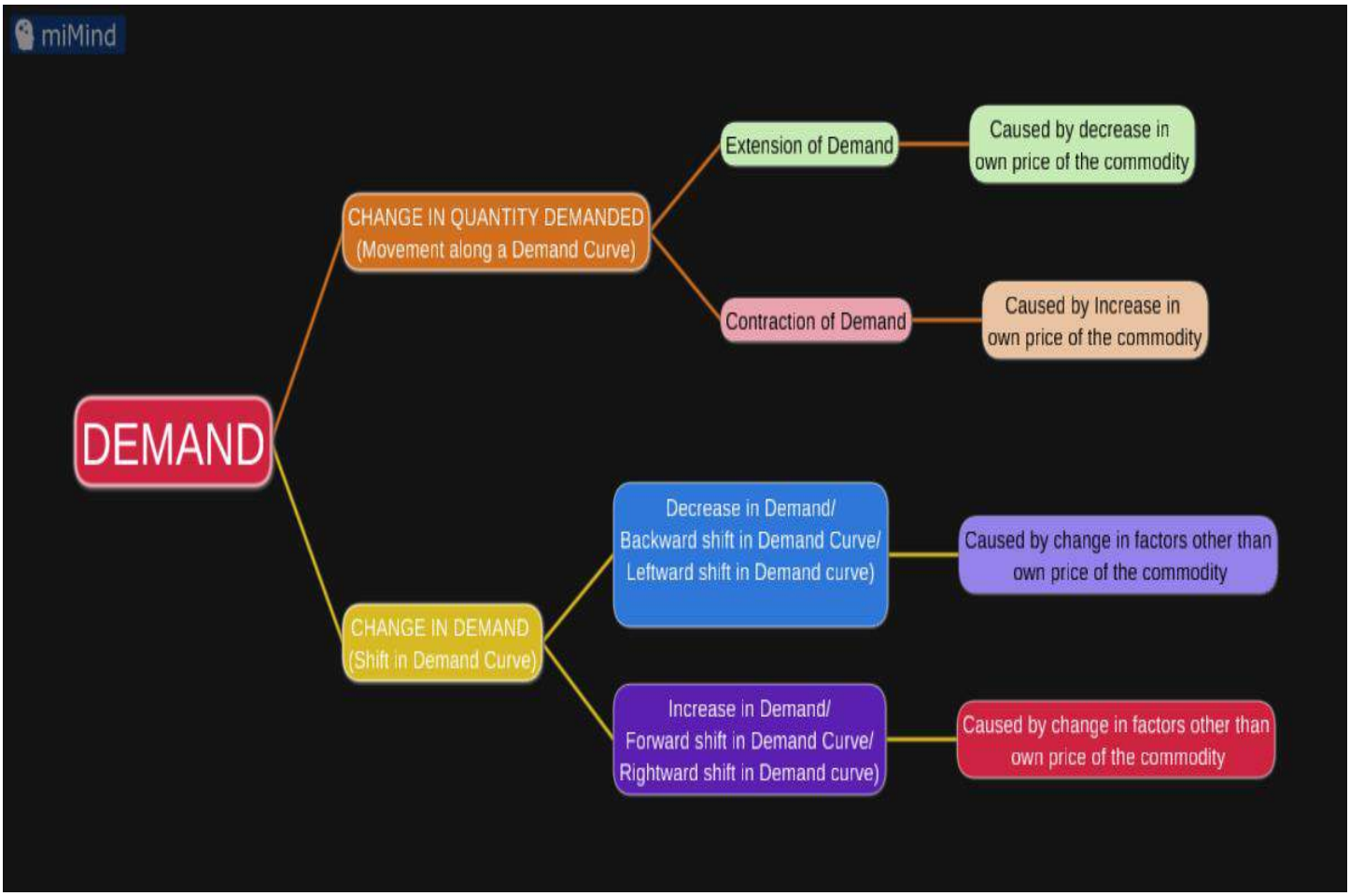
Ref: content given above

Application level questions

1. Price of the commodity increases from ₹. 10 to ₹ 12 per unit and expenditure on the commodity increases by 20% find elasticity. Give logical support to our answer.
2. At Price ₹.4, the demand for the good is 25 units. Suppose the price of the good increases to ₹5 and the demand for the good falls to 20 units. Calculate the price elasticity

MIND MAPS





Useful links: https://diksha.gov.in/play/content/do_31307062059755110418 60

UNIT 6: PRODUCER BEHAVIOUR AND SUPPLY

PRODUCTION

Production: - Production is process of transforming factor input into output.

Classification of Factor(inputs): -

Fixed factor	***Variable factor***
✧quantity cannot be changed in the short run. ✧Costs do not vary directly with output ✧Ex: - building, plant, land etc.	✧quantity can be changed in the short run. ✧Costs do vary directly with output. ✧Ex: - raw material, transport etc.

Production function: -

Production function refers to functional relationship between factor inputs and output.

$$Q = f(x_1, x_2)$$

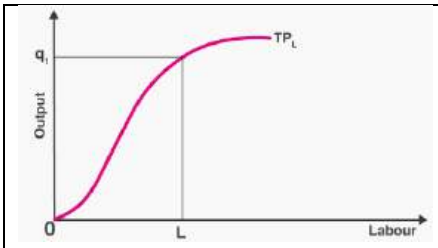
It means that by using x_1 amount of factor 1 and x_2 amount of factor 2, we can produce Q amount of the commodity.

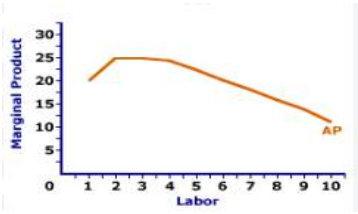
Types of production function: -

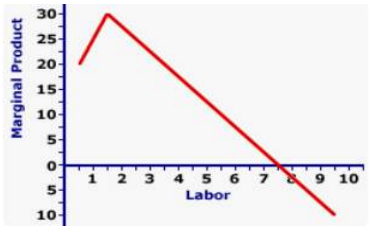
Short run Production function:	***Long run Production function***:
✧ Change in physical output of a good when one factor input is variable and the others are fixed. ✧ known as "Law of returns to a factor"	✧ Change in physical output of a good when all the factor inputs are variable ✧ known as "Law of returns to scale".

Concepts of Production: -

Total product or total physical product (TP/TPP)	**Average product or Average physical product (AP/APP)**	**Marginal product (MP)**
Total output of a commodity at a particular level of a variable factor when combined with fixed factors.	Average Product is defined as the output (product) per unit of variable input.	change in total product or output per unit of change in variable input, while keeping the other factors fixed
TP = Σ MP TP = AP x L	AP = TP/ L	$MP_n = TP_n - TP_{(n-1)}$ $MP = \frac{\Delta TP}{\Delta\ in\ variable}$



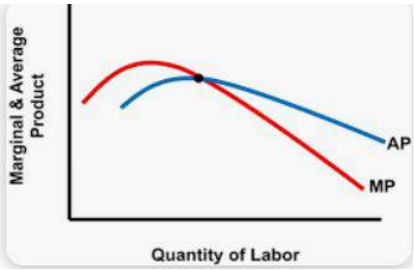




Relationship between MP and AP: -

.

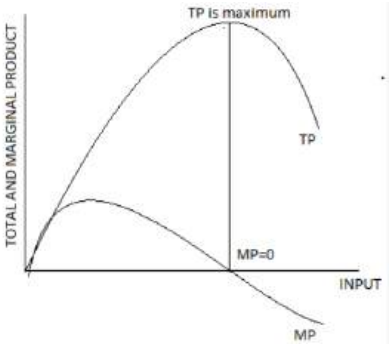
- When MP > AP, AP rises
- When MP < AP, AP falls
- When MP = AP is at its maximum.
- MP cuts AP from above.



Relationship between TP and MP: -

.

- As long as TP increases at increasing rate, MP increases.
- When TP increases at diminishing rate, MP falls positively.
- When TP becomes maximum and constant, MP becomes zero.
- When TP decreases, MP becomes negative.
- TP = Σ MP

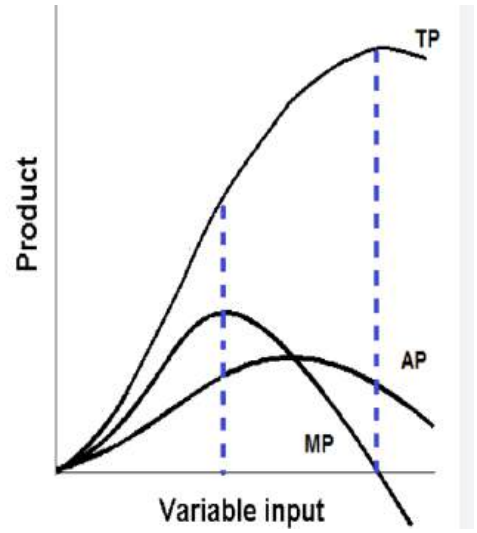


LAW OF VARIABLE PROPORTION (RETURN TO A FACTOR)

The law says that as we employ more and more variable factor keeping all other factors fixed, initially Total product (TP) increases at increasing rate, after reaching a certain level of employment it increases at diminishing rate, then it starts falling.

According to this law there are three stages of production: -

1. Increasing Returns to a Factor
2. Diminishing returns to a Factor
3. Negative returns to a Factor

Capital (K)	Labour (L)	TP	MP	Stages	
1	0	0	--	I stage: Increasing RTF	
1	1	2	2		
1	2	6	4		
1	3	12	6		
1	4	16	4	II stage: Diminishing RTF	
1	5	18	2		
1	6	18	0		
1	7	14	(-) 4	III stage: Negative RTF	
1	8	8	(-) 6		

	Phase/Stage I Increasing Returns to a factor	Phase/Stage II Increasing Returns to a factor	Phase/Stage III Negative Returns to a factor
TP	increases at increasing rate	increases at diminishing rate	decreases
MP	increases	decreases positively	Becomes negative
Causes	Better utilization of fixed factor. Better co-ordination between factors. Efficient utilization of variable factor	Over utilization of fixed factor. Poor co-ordination between factors Imperfect substitution of factor.	Fixity of fixed factor. Overcrowding of variable factor Defective factor ratio

COST OF PRODUCTION

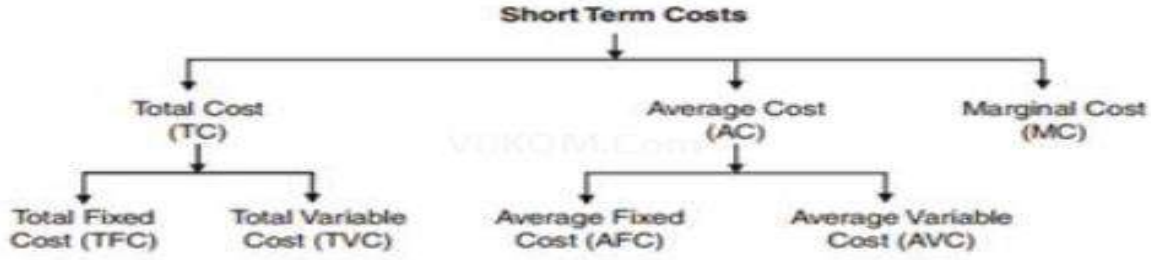
Cost of Production: - Cost refers to the ***expenditure*** incurred on the factor inputs as well as non-factor inputs utilized in the production of goods and services.

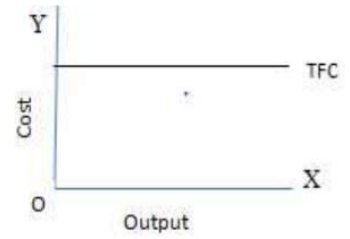
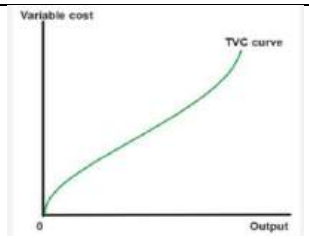
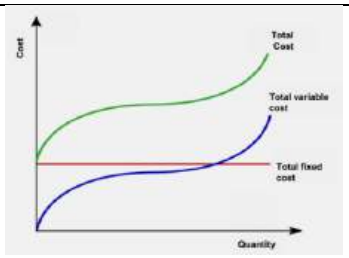
Real cost: - It refers to sacrifice, mental and physical efforts spent to produce a commodity. This cost cannot be measured in terms of money as it is subjective.

Implicit cost: - Implicit are the cost of self-owned and self-employed resources by the firm including estimated normal profit. These costs are ***imputed value*** (estimated) value.

***Explicit cost*: - Explicit** cost are the cash payment made by the firms to outsiders for the purchase or hire of goods and services.

CONCEPTS OF COST OF PRODUCTION

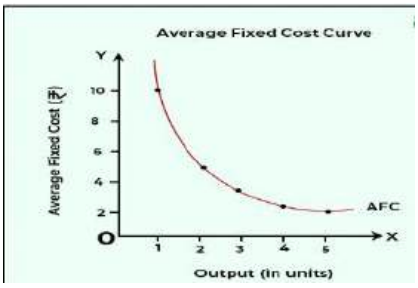
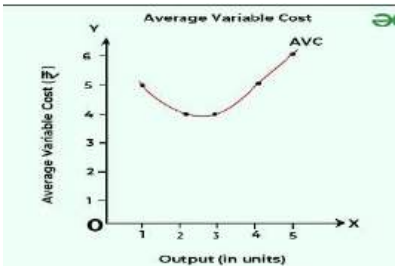
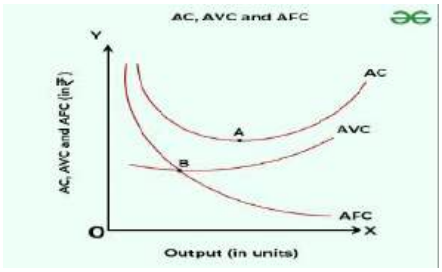


Total Fixed Cost (TFC)	***Total Variable Cost (TVC)***	***Total cost*** (TC)
Cost which are incurred on the fixed factors of production.	Cost which are incurred on the variable factors of production.	sum of all expenditures incurred in producing a given quantity of a good.
TFC = TC - TVC TFC = AFC x output	TVC = TC - TFC TVC = AVC x output TP = Σ MP	TC = TFC + TVC TC = AC x Output
		
✧straight line parallel to X-axis. ✧remains constant at all levels of output	✧S shaped curve starting from 0 ✧Initially increases at decreasing rate and then at increasing rate.	✧S shaped curve parallel to TVC ✧Never be 0 because TFC is positive and constant.

Numerical example: -

output	0	1	2	3	4	5	6	7	8
TFC	20	20	20	20	20	20	20	20	20
TVC	0	10	18	24	28	32	38	46	58
TC	20	30	38	44	48	52	58	66	78

AVERAGE COST (AC)

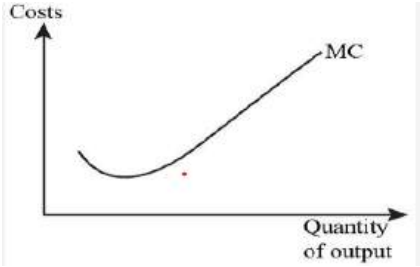
Average Fixed Cost (AFC)	***Average Variable Cost (AVC)***	***Average cost*** (AC)
per unit fixed cost of producing the commodity	per unit variable cost of producing the commodity.	per unit cost of producing the commodity.
AFC = AC - AVC AFC = $\frac{TFC}{Output}$	AVC = AC - AFC AVC = $\frac{TVC}{output}$	AC = $AFC + AVC$ $AC = \frac{TC}{output}$
		
AFC goes on falling and forms a down ward sloping curve but never touches X-axis as fixed cost can never be zero.	As the output increases, the AVC begins to fall due to the operation of law of increasing returns then reaches its minimum and then starts increasing due to the law of diminishing returns.	Both AC and AVC curves are U-shaped. As level of output increases, the vertical difference between AC and AVC curves goes on decreasing as AFC goes on decreasing as output increases.

Numerical example: -

output	0	1	2	3	4	5	6	7	8
AFC	--	20	10	6.6	5	4	3.3	2.9	2.5
AVC	--	10	9	8	7	6.4	6.2	6.7	7.25
AC	--	30	19	14.6	12	10.4	9.5	9.5	9.75

MARGINAL COST (MC)

Marginal cost is the change in total cost by producing one more unit of output. In other words, it is the addition to the TVC/TC when an additional unit is produced.



$MC_n = TC_n - TC_{(n-1)}$

$MC_n = TVC_n - TVC_{(n-1)}$

$MC = \frac{\Delta TC}{\Delta Q}$

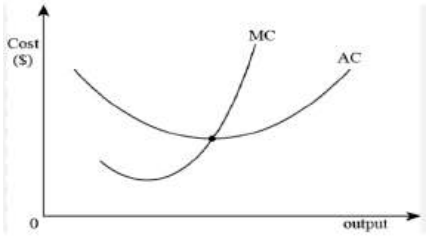
$\Sigma MC = TVC$

Numerical example: -

output	0	1	2	3	4	5	6	7	8
TFC	20	20	20	20	20	20	20	20	20
TVC	0	10	18	24	28	32	38	46	58
TC	20	30	38	44	48	52	58	66	78
MC	--	10	8	6	4	4	6	8	10

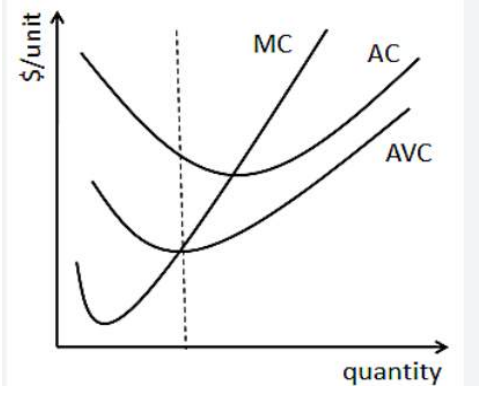
Relation between AC and MC

1. When MC < AC, AC falls
2. When MC > AC, AC rises
3. When MC = AC, AC is minimum
4. MC cuts AC from below.
5. Both MC and AC are 'U'-shaped curve.



Relation between AC, AVC and MC

1. When AC and AVC declines, MC declines faster than AC and AVC. So that MC curve remain below AC curve and AVC curve.
2. When AVC increases, MC increases faster than AVC. So that MC is above AVC curve.
3. When AC increases, MC increases faster than AC. So that MC is above AC curve.
4. Since MC declines faster than AC and AVC it reaches its lowest point earlier than ACand AVC. So that MC starts rising even AC and AVC is falling.
5. MC cuts AC and AVC from its lowest point.



REVENUE

Revenue of a firm is its ***sales receipts*** or money receipts from the sale of a product.

Revenue = Quantity sold X Price

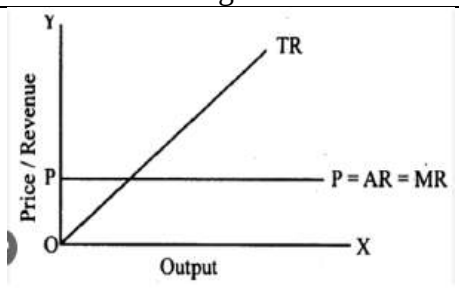
Total Revenue (TR)	**Average Revenue (AR)**	**Marginal Revenue (MR)**
It is the amount a firm receives by selling a given quantity of output.	pIt is the per unit revenue received from the sale of the commodity.	Marginal Revenue is the addition to the total revenue when an additional unit is sold in the market.
TR = P x Qty TR = AR x Qty TR = Σ MR	AR = $\frac{TR}{output}$	$MR_n = TR_n - TR_{(n-1)}$ MR = $\frac{\Delta TR}{\Delta output}$

AR is same as price, AR = $\frac{TR}{Q} = \frac{P \times Q}{Q} = P$

Relation Among TR, AR, MR

a) ***In Perfect Competition***: -

In this market there are large number of buyers and sellers and the product is homogeneous (identical). ***Price remains same, that is a producer can sell any quantity at constant price***.

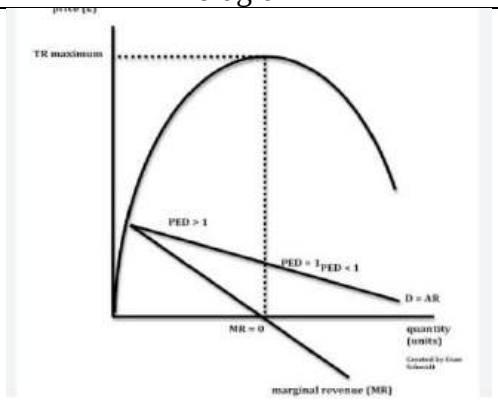
Qty sold	Price	TR	AR	MR	diagram
1	10	10	10	10	
2	10	20	10	10	
3	10	30	10	10	
4	10	40	10	10	
5	10	50	10	10	
6	10	60	10	10	

- In perfect competitive market Price remains constant so ***TR increases at constant rate and MR is constant.*** Here AR = MR = P
- TR curve is positively sloped straight line.AR and MR curves coincide in a ***horizontal straight line parallel to X- axis.***

b) ***In Non- Perfect Competition market***: - (monopoly, monopolistic or Oligopoly market): -

In such market producer can sell more product by lowering the price, that is if the producer can sell only less product at higher price.

Qty sold	Price	TR	AR/P	MR	diagram
1	10	10	10	10	
2	8	16	8	6	
3	6	18	6	2	
4	4	16	4	-2	
5	2	10	2	-6	



Relationship between TR and MR

1. When MR falls positively TR increases
2. When MR becomes zero, TR is maximum constant
3. When MR becomes negative, TR decreases.

Relationship between AR and MR

1. AR falls when MR< AR
2. MR curve is steeper than AR curve
3. MR can fall to zero and become negative but
4. AR is always positive.

PRODUCER'S EQUILIBRIUM

A producer (a firm) is said to be in equilibrium when it earns maximum profits.

Conditions in MR-MC approach: -

1. MR=MC
2. MC is rising (That is slope of MC is more than slope of MR)

or

MC is greater than MR after equilibrium level of output.

Numerical example: -

output	1	2	3	4	5	6
MR	6	6	6	6	6	6
MC	7	6	5	4	6	7

At the fifth level of output the producer is in equilibrium, at this point MR=MC and MC rise after equilibrium.

Diagram: -

In the diagram at OQ level of output the producer is in equilibrium. At this point MR=MC and MC rising after equilibrium.

THEORY OF SUPPLY

Supply of a commodity: -The quantity of the good, which a producer or a seller or a firm is willing to sell at a particular price during given period of time.

Individual supply: - The quantity of the good, which an individual producer or a seller is willing to sell at a particular price at a point of time.

***Individual supply schedule:* -** It is the table showing different quantities of a commodity supplied by an individual seller or producer at different possible prices at a point of time.

***Individual supply curve*: -** It is a graphical presentation of individual supply schedule. It shows the different quantities of a commodity supplied by an individual seller or producer at different possible prices at a point of time.

Market supply schedule: -Itis the table showing different quantities of a commodity supplied by all the sellers or producers in a market at different possible prices at a point of time.

Market supply curve: - It is a graphical presentation of market supply schedule. It is the horizontal summation of individual supply curve.

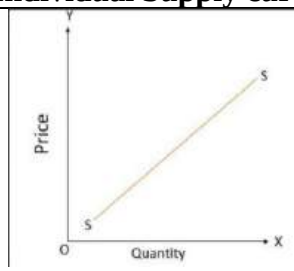
Individual Supply schedule

Price	Quantity
1	5
2	10
3	15
4	20

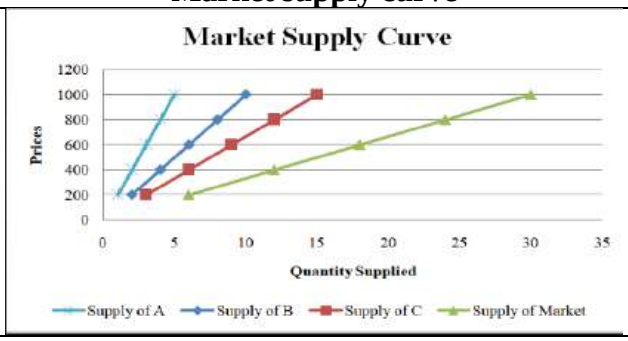
Market supply Schedule

Price	Qty supply Producer A	Qty supply Producer B	Qty supply Producer C	Market supply
10	5	8	10	23
20	6	10	13	29
30	7	12	16	35
40	8	14	19	41

Individual Supply curve



Market supply curve



Law of Supply: -The law states that "other things being equal, there is a positive relation between price and quantity supplied of a commodity. Other things are techniques of production, Government policy, price of inputs and price of other goods etc.

Supply function: - It shows the relationship between supply for a commodity and the factors determining supply.

Individual supply function: - It shows the relationship between supply of a commodity and the factors determining supply by a seller or producer. **$S = f$ (Px, Pi, T, G, Po)**

***Market supply function*: - It** shows the relationship between supply for a commodity and its various determinants (factors) by all sellers or producers in a market. **$S_m = f$ (Px, Pi, T, G, Po, N)**

(where Px = price of the commodity, P_i = Price of inputs, T = Technique of production, G= Government policies, Po = Price of other good, N = number of sellers or firm)

Determinants (factors) affecting Individual supply

1. ***Price of the commodity***: - There is positive relationship between price of the commodity and quantity supply.
   In the supply curve there will be upward movement along the same supply curve if price increases and down movement when price falls.
2. ***Technical Changes: -***
   (a) Improvement or advancement in technology lowers the marginal cost and raises the profit. As a result, the investment increases, production increases and supply increase. Upward shift in the supply curve.
   (b) if technology deteriorates, MC rises which reduces the profit margin. The investment falls, production falls and supply decreases. Left ward shift in the supply curve.
3. ***Price of inputs***:
   (a) If input price falls, MC falls and profit margin increases. As a result, the investment increases, production rises and supply rises. Right ward shift in the supply curve.
   (b) If input price rises, MC rises which lowers the profit margin. As a result, the investment decreases, production falls and supply falls. Left ward shift in the supply curve.
4. ***Change in government policy (taxation and Subsidy Policy***): -
   (a) If tax rate decreases or subsidy increases, MC decreases and profit margin increases. The investment rises, production rises and supply increases. Right ward shift in the supply curve.
   (b) If tax rate increases or subsidy decreases, MC decreases which lowers the profit margin., investment falls, production falls and supply decreases. Left ward shift in the supply curve.
5. ***Price of Other goods: -***
   (a) if price of the other related goods increases, the producer will shift the given resources to produce the good which is highly priced and thus makes more profit, then supply of the commodity in question decreases. Supply curve shifts left ward.
   (b) If price of the other related goods decreases, the producers of other goods whose price is decreasing will shift to the commodity in question then supply of the commodity in question increases. Supply curve shift right wards.

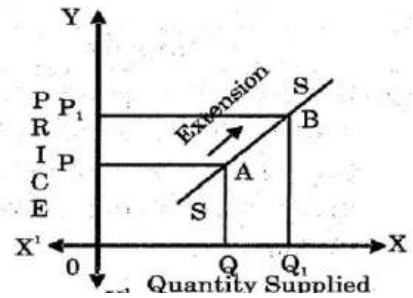
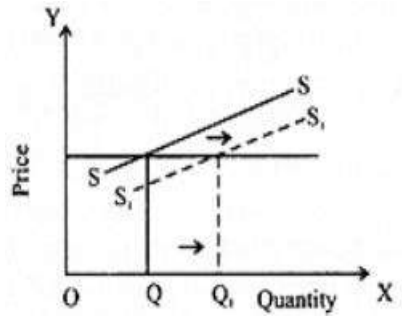
Distinguish between Extension of supply and increase in supply

Extension in supply	**Increase in supply**
1. It is due to rise in its price, other things being equal. 2. There will be upward movement along the same supply curve 3. Numerical example: -	1. It is due other factors affecting supply than price of the commodity 2. There will be right ward shift in the supply curve. 3. Numerical example: -

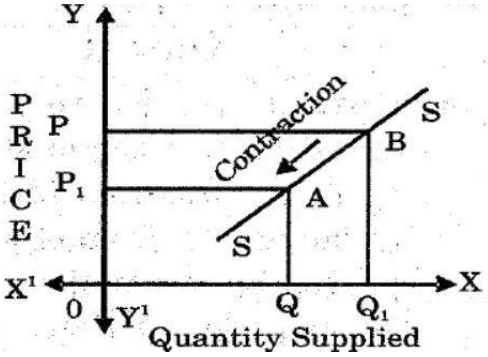
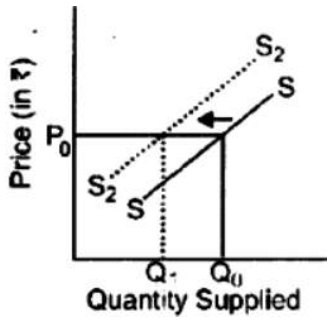
Price	Qty
10	4
20	6

Price	Qty
10	4
10	6

4.

4. Diagram  5. More quantity is supplied at higher price 6. Law of supply is applicable	Diagram: -  5. More quantity is supplied at the same price. 6. Law of supply is not applicable.

Distinguish between Contraction of supply and decrease in supply

Contraction in supply	Decrease in supply
1. Quantity supply falls due to decrease in price. 2. There will be downward movement along the same supply curve 3. Numerical example: -	1. It is due other factors affecting supply than price of the commodity 2. There will be left ward shift in the supply curve. 3. Numerical example: -
Price: 20, 10 — Qty: 6, 4	Price: 10, 10 — Qty: 6, 4
4. Diagram  5. Less quantity is supplied at lower price 6. Law of supply is applicable	4. Diagram: -  5. Less quantity is supplied at the same price. 6. Law of supply is not applicable.

Causes of increase in supply

1. decrease in price of inputs,
2. decrease in tax rate,
3. increase in subsidies,
4. improvement in technology
5. decrease in the price of other goo

Causes of decrease in supply

1. increase in price of inputs,
2. increase in tax rate,
3. decrease in subsidies,
4. deterioration in technology
5. increase in price of other goods.

PRICE ELASTICITY OF SUPPLY

It is a measure of degree of responsiveness of ***supply*** of a commodity to change in its ***price***. In other words, it quantifies the effect of a change in own price (Px) on the quantity supplied of a commodity.

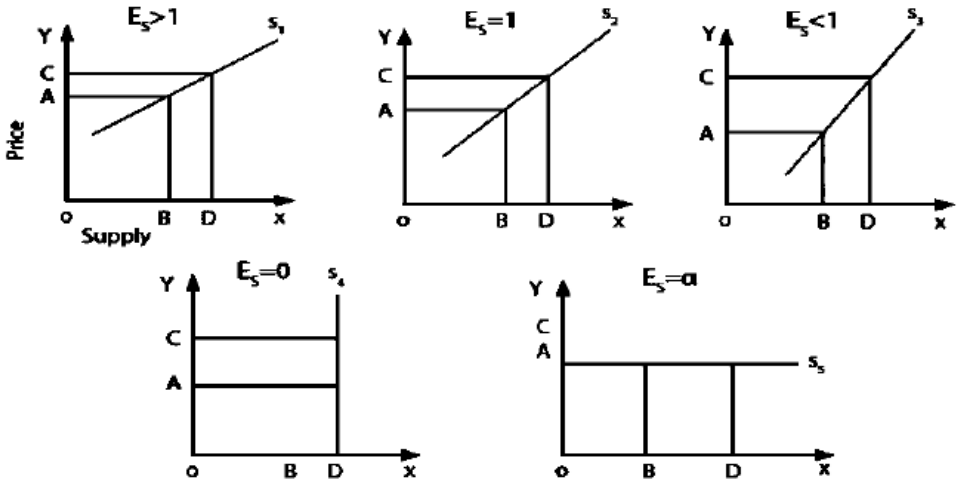
$$E_s = \frac{Percentage\ (\%) change\ in\ quantity\ supplied}{Percentage\ (\%) in\ price\ of\ the\ commodity}$$

$E_s = \frac{P}{Q} \ \mathcal{X} \ \frac{\Delta Q}{\Delta P}$ where Q_1 = new quantity Q = Initial quantity

P_1 = New price, P = Initial price

Degrees of Price Elasticity of Supply

1. ***Perfectly Elastic supply***: - It refers to a situation when supply of a commodity is infinite at the prevailing price. The supply curve is a horizontal straight line. Here Es = ∞.
2. ***Perfectly inelastic supply***: - in this case a change in price of the good causes no change in its quantity supply. The supply curve is a vertical straight line parallel to Y-axis. Here Es = 0
3. ***Unitary elastic supply***: - In this case % change in supply is equal to % change in price of the commodity. Here Es =1
4. ***Greater than Unitary elastic supply (Elastic supply)***
   In this case, % change in quantity supply is greater than the % change in the price of the commodity. Here Es >1.
5. ***Less than Unitary elastic supply (Inelastic supply)***
   In this case, % change in quantity demand is less than the % change in the price of the commodity. Here Es <1.



ONE MARK QUESTIONS

1. Which of the following statements is incorrect with respect to Production function?
    a. Production function shows the maximum quantity of output that can be produced for various quantities of inputs used.
    b. Production function shows different combinations of output that can be produced for given quantities of inputs used.
    c. A production function is defined for a given technology
    d. None of the above
2. Mr. Sukesh is planning to start a new business. He has set up a suitable factory space, purchased machinery and computer systems and hired key managerial personnel. Identify which of the following is not a fixed factor of production.
    a. Purchase of machinery b. Building for factory space
    c. Hiring of managerial personnel d. All of the above
3. Identify the correctly matched pair from the following

Concept	Meaning
a) Average Product	(i) dividing change in TP by change in variable factor
b) Marginal Product	(ii) output per unit of variable input.
c) Total Product	(iii) The sum of marginal products.

    a. (a) - (i) b. (b) - (ii) c. (c) - (iii) d. All are correct
4. Which of the following equations is correct?
    a. AP = TP/L b. MP = Δ TP/ Δ L c. MP = TP n - TP n-1d. All are correct
5. A firm is operating with 3 workers and the production is 136 units. Now that it has decided to add another worker and it was noticed that the production went up to 160 units. Based on the above information, calculate the Marginal product of 4th unit of worker
    a. 160 units b. 36 units c. 24 units d. 136 units
6. Which of the following is not an assumption of the Law of Variable proportions?
    a. All units of the variable factor are homogenous
    b. Firm can change all of its inputs
    c. Both a &b
    d. None of the above

7. Marginal Product of the variable factor is calculated by
    a. MPL = TP at L units - TP at (L-1) units
    b. Marginal product = Change in output/Change in input
    c. MP = TP / L
    d. Both a & b
8. _____ shows the pattern of change in total product when only one input is increased, other inputs remaining unchanged.
    a. Total Physical product
    b. Marginal Physical Product
    c. Law of variable proportion
    d. Returns to scale
9. Which of the following is a reason for Decreasing returns to a factor?
    a. Division of labor and specialization
    b. Optimum combination of Fixed and Variable factors
    c. Over utilization of fixed factor
    d. Under-utilization of fixed factor
10. In phase III of variable proportions _____ falls continuously but is positive whereas, _____ turns negative
    a. Marginal product & Total product
    b. Total product and Average product
    c. Total product & Marginal Product
    d. Marginal Product & Average Product
11. TP curve is _____ in Phase I and _____ in Phase II
    a. Convex & Concave
    b. Downward sloping and Upward rising
    c. Concave & Convex
    d. Downward sloping and Upward rising
12. Both AP & MP curves are generally_____
    a. U shaped
    b. Inverse U-shaped
    c. Download sloping
    d. Upward sloping
13. Which of the following is not a component of the fixed cost of a firm?
    a. License fee
    b. Salaries of permanent staff
    c. Cost of raw materials
    d. Expenditure on Land & building
14. A firm, while keeping its price constant, is able to sell more of its output. What will be the shape of the MR curve of the firm?
    a. MR curve will be upward sloping
    b. MR curve will be downward sloping
    c. MR curve will be a horizontal straight line
    d. MR curve will be a vertical straight line

15. What is the shape of the AFC curve for a firm?
    a. Inverse S shaped
    b. Rectangular hyperbola
    c. Horizontal line
    d. None of the above

16. Geometrically, the total area under MC curve corresponding to any level of output measures_____
    a. AVC b. TC c. AC d. TVC

17. Identify the correctly matched pair of items from the following
    a. TR reaches it maximum —---> MR is maximum
    b. TR rises at an increasing rate —----> MR falls but positive
    c. TR rises at a decreasing rate —-----> MR increases
    d. TR is falling —-------> MR is negative

18. When output increases from 6 to 8 units, TR increases from ₹250 to ₹300. MR is:
    a. ₹50 b. ₹25 c. ₹100 ₹250

19. AR curve is horizontal straight line under
    a. Perfect competition
    b. Monopoly
    c. Monopolistic competition
    d. All the above

20. The cost of self-owned inputs of a firm is known as _____
    a. Implicit cost b. Imputed Cost c. Explicit cost d. Both a & b

21. Mr. Mukesh opens a new bakery in his own building. He acts as a cashier and he hires 2 other workers. Identify the implicit cost of his business
    a. Salary paid to hired workers
    b. Rent of the bakery premise
    c. The wages that go to the cashier
    d. Both b & c

22. AR is always equal to _____
    a. Revenue b. Price c. Cost d. Profit

23. Which of the following defines a Producer's equilibrium point?
    a. No profit no loss for the producer
    b. Profit is maximum for the producer
    c. TR &TC are equal for the producer
    d. None of the above

24. Supply refers to:
    a. Quantity of a commodity which a producer is willing to sell at a specific price
    b. Various quantities of a commodity which a producer is ready to sell at different possible prices
    c. Total quantity of the commodity available with the producer at a point in time
    d. All the above

25. Extension in supply is due to
    a. Fall in own price of a commodity b. Rise in own price of a commodity
    c. Reduction in taxes d. Increase in the number of producers

26. Contraction in supply is shown diagrammatically as
    a. Leftward shift of supply curve b. Rightward shift of supply curve
    c. Downward movement in the supply curve d. None of the above

27. Which of the following factors results in a forward shift of supply curve?
    a. Increase in factor prices b. Increase in taxes by government
    c. Improvement in technology d. Increase in price of the commodity

28. Subsidy on the production of a commodity results in
    a. Increase in supply b. Decrease in supply
    c. Both a & b d. No change in supply

29. When supply curve is vertical straight line, the commodity is said to have:
    a. Unitary elastic supply b. Perfectly elastic supply
    c. Relatively elastic supply d. Perfectly inelastic supply

30. If a producer expects a price rise in the near future, current supply of the commodity tends to
    a. Rise b. Fall c. remain unchanged d. None of the above

ANSWERS

1. b	2. c	3. c	4. d	5. c	6. b	7. d	8.c	9. d	10. c
11. a	12. c	13. c	14.c	15. b	16.d	17. d	18. b	19.a	20. d
21. d	22. b	23. b	24. b	25. b	26. c	27. c	28. a	29. d`	30. b

FILL IN THE BLANKS

1. All factors are _____ (fixed / variable) factors in the long run
2. Only in the _____ production capacity of the firm can be increased. (Short run/Long run)
3. Short run production function exhibits _____ while long run production function expresses _____: (Returns to a factor / Returns to scale)
4. _____ is called the unit cost of production (Total cost/ Average cost)
5. Total cost is the sum of Total fixed cost & ___ (Average Variable Cost/Total Variable Cost).
6. Shape of AVC curve is _____ (inverse S / U shaped)
7. Addition to total cost due to addition of one unit of output is called _____ (unit cost/ Marginal cost)

8. Sum total of Marginal cost corresponding to different units of output becomes _____ (+Average variable cost/ Total Variable Cost)
9. When AC is falling _____ and when AC is rising _____ (AC < MC, AC>MC)
10. Average Revenue curve is _____ under Perfect competition (perfectly elastic/ perfectly inelastic)
11. The producer equilibrium condition is that beyond MC = MR, MC should be _____ (rising / falling)
12. Market supply schedule shows _____ relationship between price and quantity supplied (positive / negative)
13. Market supply curve is the supply curve of the _____ (firm/industry)
14. Slope of a straight-line supply curve is _____ (rising throughout / constant)
15. A fall in input prices will lead to _____ in supply (Extension / increase)
16. Backward shift of supply curve is caused by _____ (Price fall / factors other than price)
17. Improvement in technology causes cost of production to _____ (rise/fall)
18. Effect of rise in own price of a commodity on supply is shown by _____ in supply curve (upward movement / forward shift)
19. The supply of a durable good is usually_____. (more elastic / less elastic)
20. Firm's supply curve is indicated by the _____ segment of MC (rising / falling)

ANSWERS

1. Variable
2. Long run
3. Returns to a factor & Returns to scale
4. Average cost
5. Total Variable cost
6. U shaped
7. Marginal cost
8. Total Variable Cost
9. AC < MC, AC>MC
10. perfectly elastic
11. rising
12. positive
13. industry
14. constant
15. Increase
16. Factors other than price
17. fall
18. Upward movement
19. More elastic
20. rising

ASSERTION & REASONING

Read the two statements labelled as Assertion (A) & Reason (R) and choose the correct option from the below

a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
c. Assertion (A) is true but the Reason (R) is false.
d. Both Assertion (A) and Reason (R) are false.

1. Assertion (A): Production function is defined with respect to a given technology
   Reason (R): Technical improvements results in change of production function

2. Assertion (A): Production capacity remains constant in the short run
   Reason (R): Production can be increased only by increasing variable factors of production.

3. Assertion (A): Long run is a period of time in which there is no distinction between fixed and variable factors exists
   Reason (R): What is fixed factor in the short run becomes variable in the long run

4. Assertion (A): In case of disguised unemployment, TP increases when some workers are withdrawn.
   Reason (R): MP of a variable factor can never be negative

5. Assertion (A): In the short run firms have no flexibility to adjust any of its inputs.
   Reason (R): Short run generally is defined in terms of say, days, weeks or month

6. Assertion (A): Fixed costs are incurred even before production actually starts
   Reason (R): Fixed cost is zero at zero level of output

7. Assertion (A): Producer's equilibrium is struck at that level of output where profit is maximized
   Reason (R): Profit is maximized when the difference between TR & TC is minimized

8. Assertion (A): Increase in supply is due to factors other than price.
   Reason (R): Increase in supply occurs when more is supplied at a lower price.

9. Assertion (A): Increase in supply occurs when more is supplied at existing price
   Reason (R): Increase in supply is basically related to fall in the cost of production

10. Assertion (A): Supply of a commodity expands or contracts with a price rise or price fall.
    Reason (R): Supply never changes unless price changes

ANSWERS:

1. a	2. b	3. a	4. c	5. d
6. c	7. c	8. c	9. b	10. c

SHORT ANSWER TYPE

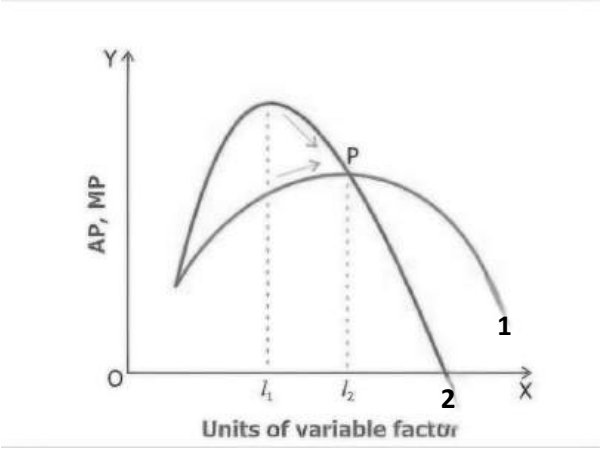
1. State the Law of variable proportion and name the three stages of the law
   Ans Hint: Refer to Law of Variable proportion given in Gist of the lesson.

2. MP can be negative but not AP. Comment
   Ans: MP can be zero or negative but AP is never. AP is the ratio between TP and units of the variable factor. Since units of variable factor is always positive, AP can never be negative. But MP is change in TP owing to an additional unit of the variable factor which can be zero or negative.

3. Differentiate between Short run and long run production function

Short run production function	Long run production function
Represents the relationship between inputs and outputs when at least one input is fixed	Represents the relationship between inputs and outputs when all inputs can be varied
Output can be increased only by increasing the quantity of variable input	Output can be increased by increasing all of its inputs
Also known as Returns to a factor	Also known as Returns to scale

4. Identify the curves labelled as 1 & 2 and explain the significance of point P



Ans: Curve 1 is the Average product curve and curve 2 is the Marginal product curve of the variable factor

At point P, the MP curve cuts the AP curve from above at its maximum point. Only at this point AP = MP.

As long as AP is rising, MP > AP (to the left of point p)

When AP is maximum and constant, MP = AP

When AP starts falling, MP < AP (to the right of point p)

5. "In economics, cost is taken as the sum of both Explicit cost and Implicit cost". Explain with example the difference between Explicit cost and Implicit cost

Explicit cost	Implicit cost
Actual money expenditure incurred by a firm in hiring or buying factors of production	Cost of factors of production owned and used by the firm in the production process
Shown in the books of accounts	Does not enter books of accounts of a firm
Also known as accounting cost	Also, knowns as imputed cost
E.g. wages, rent, insurance payment etc.	E.g. Wages of self-labor, rent for self-owned business premises etc.,

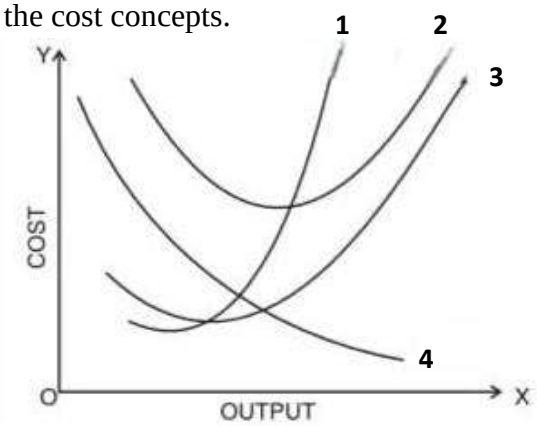
6. Define marginal cost. Illustrate with example how to calculate marginal cost given the total cost.
   Ans Hint: Refer to Marginal Cost section

7. What is meant by Increasing returns to a factor. Explain any two causes for it
   Ans Hint: Refer to Stage I of Law of Variable Proportion

8. What is meant by Diminishing returns to a factor. Explain any two causes for it
   Ans Hint: Refer Stage II of Law of Variable Proportion

9. What is meant by Negative returns to a factor. Explain any two causes for it
   Ans Hint: Refer Stage III of Law of Variable Proportion

10. Identify the cost curves labelled as 1,2,3&4 from the below diagram and write a note on each of the cost concepts.



Ans: Curve 1: Marginal cost curve. Marginal cost is defined as addition made to total cost to produce one more unit of output.

$MC = \Delta TC/\Delta Q$

Curve 2: Average Total Cost curve. Average cost is the cost per unit of output

$AC / ATC = TC/Q$

Curve 3: Average Variable Cost curve. AVC is the variable cost per unit of output

$AVC = TVC/Q$

Curve 4: Average Fixed Cost curve. AFC is the fixed cost per unit of output. $AFC = TFC/Q$

11. Total Variable Cost curve is inverse S shaped. What are the reasons for it?
    Ans: TVC is an inversely S-shaped curve due to the Law of Variable Proportion.

    In the initial stages of production, when the increasing returns to a factor is in operation, TC of the firm increases at a decreasing rate and later it increases at an increasing rate due to the operation of Diminishing returns and negative returns to variable factor.

12. A firm is able to sell as many units of a commodity as it wants without reducing the price. State and explain the relationship between AR & MR in this situation.
Ans Hint: A firm operating in a perfectly competitive market can sell its product at a constant price. Refer "Relation Among TR, AR, MR in Perfect Competition"

13. A firm has to reduce the price of a commodity to sell more units of it. State and explain the relationship between AR & MR in this situation.
Ans Hint: In a non-perfect competitive market like monopoly, monopolistic or oligopoly, producer can sell more product by lowering the price, that is the producer can sell only less product at higher price. Refer "Relation Among TR, AR, MR in No-perfect Competition"

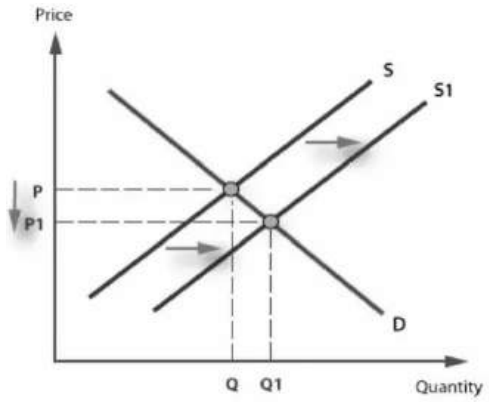
14. Complete the following table

Units of Labor	Total Product	Marginal Product	Average Product
1	____	____	2
2	____	4	____
3	____	____	4
4	17	____	____

Ans: AP = TP/L MP = ΔTP / ΔL TP = AP x Q

Units of Labor	Total Product	Marginal Product	Average Product
1	2	2	2
2	6	4	3
3	12	6	4
4	17	5	4.25

15. State and explain any two causes that can shift the supply curve as shown in the following diagram.



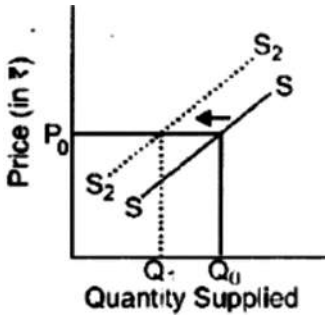
Ans Hint: Rightward shift of supply curve indicates increase in supply. Explain any two factors from the following. Causes of increase in supply

1. decrease in price of inputs,
2. decrease in tax rate,
3. increase in subsidies,
4. improvement in technology
5. decrease in the price of other goods

16. "Expansion in supply happens when there is a rise in price of a commodity". Explain using a diagram.
    Ans Hint: refer to Expansion in supply given under "Distinguish between Extension of supply and increase in supply"

17. Contraction in supply happens when there is a fall in price of a commodity". Explain using a diagram.
    Ans Hint: refer to Contraction in supply given under "Distinguish between Contraction of supply and decrease in supply"

18. Price of Tea is on a rise. Explain how it will affect the supply of Coffee. Use diagram
    Ans: Increase in price of other goods leads to decrease in supply. When price of Tea is on a rise, sellers find it profitable to sell more of tea and less of coffee. Hence supply of coffee will be reduced even when price of coffee remains unchanged. This can be depicted diagrammatically by a leftward shift of supply curve of coffee



19. The price of a commodity falls from ₹100 to ₹85 consequently its supply falls from 200 units to 155 units. calculate the price elasticity of supply. Also comment on the type of elasticity of supply.

Ans: To calculate the price elasticity of supply (Es), we use the formula:

Es=percentage change in quantity supplied / percentage change in price

$$\text{\% change in price} = \frac{P2-P1}{P1} \times 100$$

$$= \frac{85-100}{100} \times 100$$

$$= -15\%$$

$$\text{\% change in quantity supplied} = \frac{Q2-Q1}{Q1} \times 100\%$$

$$= \frac{155-200}{200} \times 100\% = -45\%$$

$$Es = \frac{-45\%}{-15\%} = 3$$

Since the price elasticity of supply (E_s) is greater than 1 (specifically, Es = 3), we classify it as elastic.

20. From the following identify the Producer's equilibrium point and give reasons for your Answer

Output	Price	Total Cost
1	12	13
2	12	25
3	12	36
4	12	46
5	12	56
6	12	68
7	12	81

Ans Hint: A producer (a firm) is said to be in equilibrium when it earns maximum profits.

Conditions in MR-MC approach: -

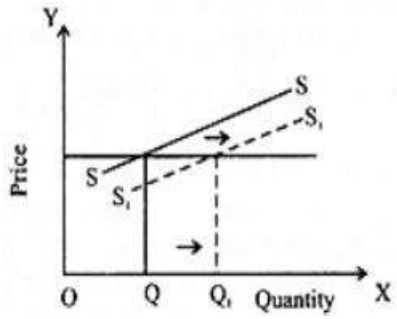
1. MR=MC

2. MC is rising (That is slope of MC is more than slope of MR) or MC is greater than MR after equilibrium level of output

Output	**Price**	**Total Cost**	**MC**	**TR**	**MR**
1	12	13	-	13	-
2	12	25	12	24	12
3	12	36	11	36	12
4	12	46	10	48	12
5	12	56	10	60	12
6	12	68	12	72	12
7	12	81	13	84	12

The producer attains equilibrium by producing 6 units of output. Because only at this point two conditions of producer equilibrium are satisfied.

21. How does technological progress affect the supply curve? Explain. Use diagram
    Ans Hint: Technological progress generally shifts the supply curve to the right by reducing costs, increasing productivity, and expanding the range of goods available in the market.



22. With an example, explain Individual and market supply schedule and curve.
    Ans Hint: Refer Individual supply & Market supply

LONG ANSWER TYPE

1. Explain the Law of Variable proportions through the behavior of total product and marginal product.
   Ans Hint: Law of variable proportion. Definition, stages, schedule and diagram and stages.

2. With the help of a diagram state and explain the meaning and relationship between MP & TP
   Ans Hint: Refer the Relationship between TP and MP Diagram and explanation.

3. Explain the conditions of producer's equilibrium using Marginal cost - Marginal Revenue approach with the help of a suitable table and diagram given that the producer can sell more output by lowering the price.
   Ans Hint:

4. Explain the conditions of producer's equilibrium using Marginal cost - Marginal Revenue approach with the help of a suitable table and diagram. Given that the producer can sell more output without lowering the price.
   Ans Hint: The market condition in which the producer can sell more output without lowering the price is a Perfect Competitive market. Refer to Producer's Equilibrium given in Gist of lesson.

5. Differentiate between extension of supply and increase in supply. Use appropriate diagrams.
   Ans Hint: Refer Distinguish between Extension of supply and increase in supply

6. Explain the effect of the following factors on supply of a commodity
   a. Increase in Taxes b. Fall in price of the commodity

   Ans Hint: (a) Increase in Taxes leads to Decrease in supply. Refer to decrease in supply for detailed answer.

   (b) Fall price of the commodity leads to Contraction in supply Refer to Contraction in supply for detailed answer.

7. Price elasticity of supply of a commodity is affected by many factors. Explain any three factors that can influence price elasticity of supply.

   Ans: The price elasticity of supply measures how responsive the quantity supplied of a good or service is to changes in its price. Several factors can influence the price elasticity of supply:

   Time Horizon: The elasticity of supply often varies depending on the time available for producers to adjust their production levels. In the short run, many factors of production (like factories, machinery, and skilled labor) are fixed, so supply may be relatively inelastic because producers cannot easily increase or decrease output. In the long run, firms can adjust their production capacities more freely, making supply more elastic.

   Availability of Inputs: The elasticity of supply also depends on the availability of inputs required for production. If inputs are readily available and can be easily obtained at stable prices, supply tends to be more elastic. Conversely, if inputs are scarce or their prices fluctuate significantly, supply may be less elastic.

   Production Flexibility: This refers to how easily production can be adjusted in response to changes in price. Industries or firms with high production flexibility (such as those with versatile machinery or readily available alternative production methods) tend to have more elastic supplies. On the other hand, industries with specialized equipment or processes may find it harder to adjust production quickly, resulting in less elastic supply.

8. What do you mean by the term supply? Discuss the law of supply with the help of a schedule and curve

   Ans Hint: Include meaning of supply, statement of law of supply, supply schedule and supply curve

9. Law of supply assumes that the factors affecting supply remain unchanged. Which are the factors other than price that can affect supply of a commodity.

   Ans Hint: Refer determinants of supply for detailed answer.

10. Define price elasticity of supply. Draw diagrams to show the following degrees of elasticity of supply

a. ES > 1 b. ES < 1 c, ES = 1

Ans Hint: Refer degrees of Price Elasticity of Supply.

ES > 1 Elastic supply; meaning and diagram

ES < 1 Inelastic supply: meaning and diagram

ES = 1 Unitary elastic supply: meaning and diagram

CASE BASED QUESTIONS

I. Read the following news article and answer the questions that follow.

CNG, piped cooking gas price hiked in Mumbai on rise in input costs

After Delhi, CNG price in Mumbai has been hiked by Rs 1.50 per kg and the rate of cooking gas piped to houses by Re 1 due to rise in input costs. Mahanagar Gas Ltd, which retails CNG to automobiles and piped natural gas to households for cooking purposes in Mumbai and surrounding cities, said the increased prices will come into effect from the intervening night of July 8 and 9. "To meet the increasing volume of CNG and domestic piped natural gas (PNG) segments and due to further shortfall in domestic gas allocation, MGL is sourcing additional market priced natural gas (imported LNG) which has resulted in higher gas cost," the firm said in a statement. (Source: **Business Standard E paper Jul 08 2024**)

1. Show diagrammatically the effect of "Rise in input prices" on the supply of CNG and PNG
2. Government decides to reduce taxes on import of CNG & PNG. Explain how will it affect supply of a commodity? Use diagram

Ans Hint 1: Rise in input prices results in decrease in supply. Refer to decrease in supply for detailed answer

Ans Hint 2: reduction in taxes will result in increase in supply. Refer to increase in supply for detailed answer

II. Read the following news article and answer the questions that follow

NIZAMABAD: A recent spike in the retail cost of rice has people, especially residents of northern Telangana districts, worried as they are spending an extra Rs 400 to Rs 600 per 25-kg bag. As per average estimates, the price of a kilogram of regular-use rice has increased from Rs 36 to Rs 52, touching Rs 66 per kg in supermarkets and retail markets, based on the variety. A dry spell in the Krishna basin and Nalgonda district was cited, alongside exports of a fine variety

of paddy from Nizamabad, Kamareddy, Nirmal and Jagtial to Karnataka, Tamil Nadu and other states, for the sudden price rise

Source: https://www.deccanchronicle.com/nation/in-other-news/rice-price-hike-has-public-worried-881053

1. Due to rise in the prices of rice ₹36 to ₹52, supply of rice has increased from 120 kg to 150 kg. Calculate the price elasticity of supply.

2. Show diagrammatically the effect of price rise on supply of rice.

Ans 1: To calculate the price elasticity of supply (PES), we use the formula:
ES=% change in quantity supplied / % change in price
First, calculate the percentage change in price %ΔP

$$\%\Delta P = \frac{P1 - P2}{P1} \times 100\% = \frac{52-36}{36} \times 100\% = 44.44\%$$

$$\%\Delta Q = \frac{Q2 - Q1}{Q1} \times 100\% = \frac{150 - 120}{120} \times 100\% = 25\%$$

$$PES = \frac{\%\Delta P}{\%\Delta Q} = \frac{25\%}{44\%} = 0.563$$

supply of rice is relatively inelastic in response to changes in price

Ans Hint 2: The effect of price rise on supply is termed as Extension in supply. Refer extension in supply for detailed answer.

UNIT 7: PERFECT CPMPETITION-PRICE DETERMINATION AND SIMPLE APPLICATIONS

FORMS OF MARKET AND PRICE DETERMINATION UNDER PERFECT COMPETITION WITH SIMPLE APPLICATIONS

FORMS OF MARKET

Market refers to all such systems or arrangements that bring the buyers and sellers in contact with each other to effect purchase and sale of the commodity.

The following are the essential requirements of a market:

Area: It doesn't mean a particular place, it can be a point of contact between buyers and sellers.

Buyers and sellers: Buyers and sellers should be in contact with each other.

Commodity: For the existence of a market, there must be a commodity which will be sold and purchased.

Competition: Existence of competition among buyers and sellers is also an essential condition, otherwise different prices may be charged for the same commodity.

Perfect Competition: - It refers to the market situation in which there are large no of

buyers and sellers of homogenous product. Price is determined by the industry and only one price prevails in the market. Example – Agricultural Product Market.

Features of Perfect Competition

1. **VERY LARGE NO OF BUYERS AND SELLERS** –
   i) As there are large number of sellers' individual seller cannot influence market supply or price. Similarly one buyer cannot affect market demand or price.
   ii) Firms become price takers as they have to accept the equilibrium price that market demand & supply decide. So market or industry is price maker.
   iii) Due to large number of buyers firm can sell any amount of good at equilibrium price. Hence they have perfectly elastic, horizontal Average Revenue (AR) curve.
2. **HOMOGENEOUS PRODUCT** –

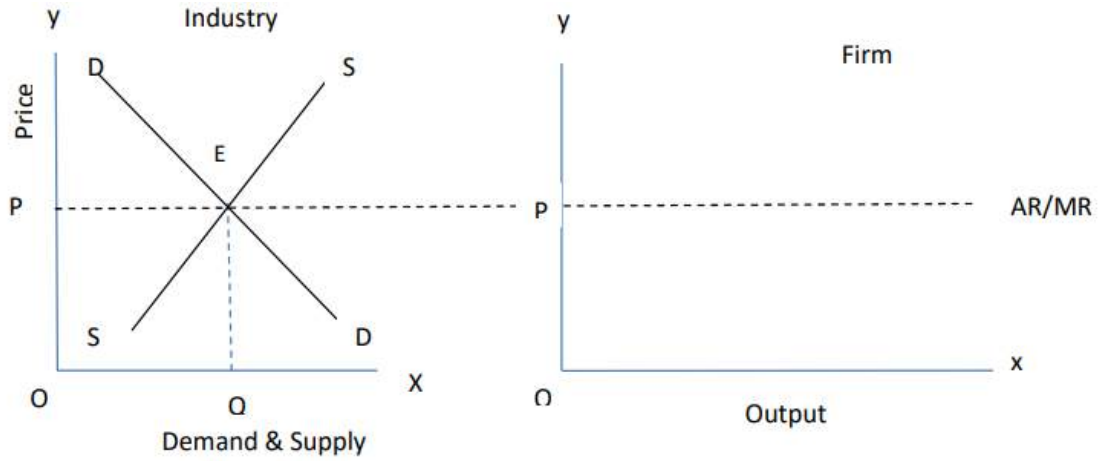
   Perfect competition market has homogenous goods which are same in shape, size, colour, price etc.

   i) So it is easy for new firms to enter into and exit from the market.
   ii) There is no selling cost as there is no need for advertising the good.
   iii) It ensures uniform price in the market
3. **FREE ENTRY AND EXIT** – Every seller has the freedom to enter or exit the industry. Therefore, no artificial and natural barriers for entry of new firms and exit of existing firms. It ensures absence of abnormal profits and abnormal losses in the long run.

4. **PERFECT KNOWLEDGE** - Buyers as well as sellers have complete knowledge of the product. So that no firm in a position to charge a different price and no buyer will pay a higher price. As a result, a uniform price prevails in the market.
5. **PERFECT MOBILITY OF FACTORS OF PRODUCTION** – There is no geographical or occupational r restriction on their movement. The factors are free to move to the industry in which they get the best price.
6. **ABSENCE OF SELLING COST** - No advertisement or selling cost is involved because of homogeneous product and perfect knowledge amongst buyers and sellers,
7. **ABSENCE OF TRANSPORTATION COST** - No transportation cost is involved in market because sellers and buyers have the perfect knowledge about the market.

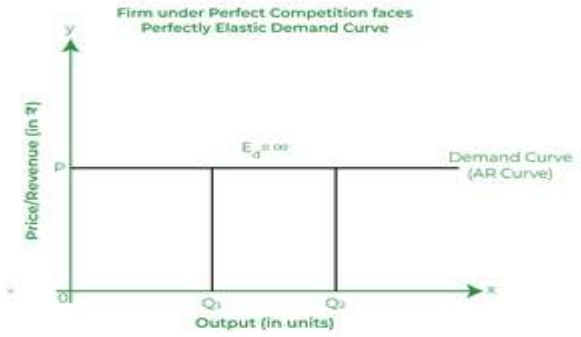
Firm under perfect competition is a price taker not a price maker.

A firm under perfect competition is a price taker not a price maker because the price is determined by the market forces of demand of supply. This price is known as equilibrium price. All the firms in the industry have to sell their outputs at this equilibrium price. The reason is that, number of firms under perfect competition is so large. So no firm can influence the price by its supply. All firms produce homogeneous product.



Demand curve under perfect competition:

In case of perfect competition there are very large number of buyers and sellers selling a homogeneous product at a price fixed by the market. Therefore, each firm is a price taker and faces a perfectly elastic demand curve. (MR=AR=P)



MULTIPLE CHOICE QUESTIONS:

1. In case of perfect competition, price is determined at;
   (a) Equilibrium price of the firm
   (b) Equilibrium price of the industry
   (c) Equality between MR and MC
   (d) Equality between MR and AR
2. In a perfectly competitive market:
   (a) Firm is a price maker and industry is a price taker
   (b) Firm is a price taker and industry is a price maker
   (c) Both are price makers
   (d) Both are price takers
3. Under perfect competition, the firm earns normal profit in the long- run because of:
   (a) Large number of buyers and sellers
   (b) Absence of selling cost
   (c) Free entry and exit
   (d) Homogeneous product
4. How much selling costs are incurred in case of a perfect competition?
   (a) Very High (b) very less (c) Negligible (d) Zero
5. The implication of perfect knowledge among buyers and sellers in case of perfect competition is:
   (a) Uniform cost structure of all firms
   (b) Equal access of technology to each firm
   (c) Uniform Profits for each firm
   (d) All of the Above.
6. Expenditure incurred by the producers to promote sale of their product is termed as:
   (a) Explicit cost (b) Implicit cost (c) Selling cost (d) Fixed cost
7. The period of time, when supply is fully adjusted to change in demand is called
   (a) Short period (b) Very short period (c) Mid-period (d) Long period

ASSERTION AND REASON QUESTIONS:

Read the statements – Assertion (A) and Reason (R). Choose one of the correct alternatives given below:

Alternatives:

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true

8. Assertion (A):There is absence of abnormal profits and abnormal losses in the long run in case of perfect competition
   Reason (R): Under perfect competition, there are no artificial and natural barriers for entry of new firms and exit of exiting firms

9. Assertion (A): Buyers are ready to pay different prices for the product produced by different firms in case of Perfect Competition.
   Reason(R): The product offered for sale in the market are homogeneous.
10. Assertion(A): In a perfect competition, since the firm is price taker, the demand curve downward slopes from left to right.
    Reason(R): Under perfect competition, a firm can sell any quantity at the same price.

STATEMENT BASED QUESTIONS:

Read the following statements carefully and choose the correct alternative from the following:

Alternatives:

a) Both the statements are true.
b) Both the statements are false.
c) Statement 1 is true and Statement 2 is false
d) Statement 2 is true and Statement 1 is false

11. Statement 1: In Perfect competition selling costs are very high.
    Statement2: Selling cost refers to cost of advertisement of the product.
12. **Statement 1**: In case of perfect competition, price is determined by a particular firm and not by the industry.
    Statement 2: Freedom of entry and exit ensures absence of abnormal profits or abnormal losses in the long run.
13. **Statement 1**: All the firms have different cost structure in case of perfect competition.
    Statement 2: Both buyers and sellers have perfect knowledge about the product market.

SHORT ANSWER TYPE QUESTIONS:

14. Explain any four characteristics of perfect competition market.

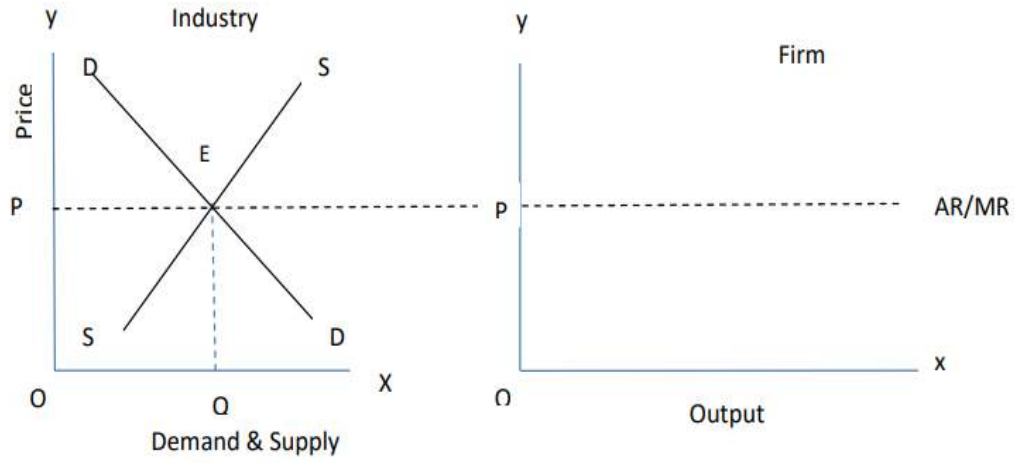
Ans:-

i. Large number of buyers and sellers: The number of buyers and sellers are so large in this market that no firm can influence the price.
ii. Homogeneous products: Products are uniform in nature. The products are perfect substitute of each other. No seller can charge a higher price for the product. Otherwise he will lose his customers.
iii. Perfect knowledge: Buyers as well as sellers have complete knowledge about the product.
iv. Free entry and exit of firm: Under perfect competition any firm can enter or exit in the market at any time. This ensures that the firms are neither earning abnormal profits nor incurring abnormal losses.

15. Explain briefly why a firm under perfect competition is a price taker not a price maker?

    Ans: - A firm under perfect competition is a price taker not a price maker because the price is determined by the market forces of demand of supply. This price is known as

equilibrium price. All the firms in the industry have to sell their outputs at this equilibrium price. The reason is that, number of firms under perfect competition is so large. So no firm can influence the price by its supply. All firms produce homogeneous product.



16. Explain the implication of the feature 'large number of buyers and sellers' in perfect Competition?
    Ans: - The number of buyers and sellers is very large under perfect competition market. The number of firms selling a particular commodity is so large that an individual seller contributes only a small part to the market supply. Thus, any increase or decrease in supply by an individual firm hardly impacts the total market supply and consequently, an individual firm cannot influence price of the commodity. accordingly, like an individual firm, an individual buyer is also not able to influence price of the commodity, only normal profits prevail in the long run.

Long answer questions:

17. Explain the implication of the following in a perfectly competitive market:
    (a) Large number of buyers.
    (b) Freedom of entry and exit to firms.
    (c) Large number of Sellers
    (d) Homogenous product.
    (e) Perfect knowledge

Ans.

a) Implication is that no individual buyer is in a position to influence the market price on its own by changing his individual demand.
b) Implication is that when existing firms are making profits, new firms enter, raise the supply of industry, bring down the market price enough for the firm to earn only normal profit in the long run. The opposite happens if the existing firm quit the industry.
c) Implication is that no single firm is in a position to influence the market price on its own by changing its output. Thus, price remain unchanged.
d) Implication is that no firm can charge higher price because no buyer is willing to pay the same. Thus market price remains the same for all firms.

e) Implication is that buyers are fully aware of the price in the market. It implies that no buyer is willing to pay a higher price for the product of any firm.

Multiple choice questions: Answers:

1. ***(a)***
2. ***(b)***
3. ***(c)***
4. ***(d)***
5. ***(d)***
6. ***(c)***
7. ***(d)***
8. ***Taker , Maker***
9. ***Perfectly elastic***

Assertive and reason questions

10 (a)

11(d)

12 (d)

Statement Based questions

13.(d)

14(d)

15(d)

PRICE DETERMINATION AND SIMPLE APPLICATIONS TOOLS OF DEMAND AND SUPPLY

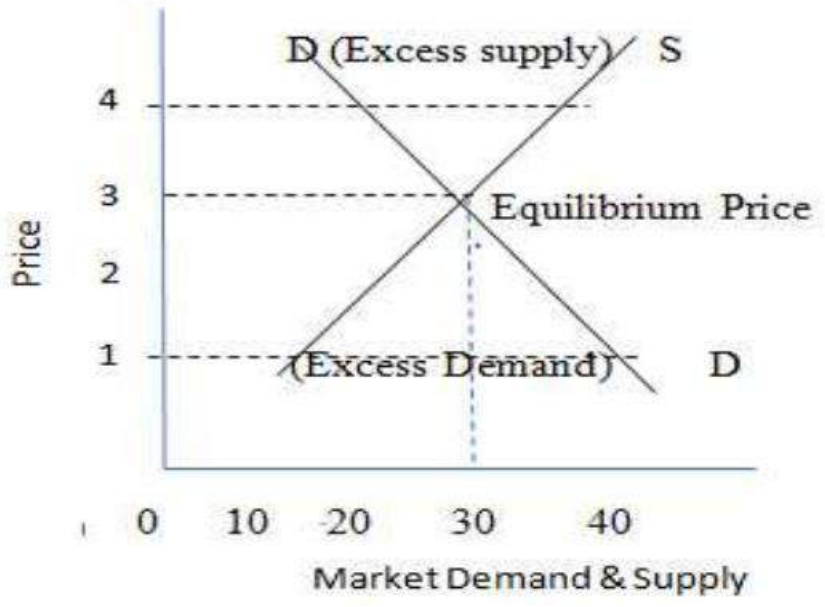
Determination of Market equilibrium under Perfect Competition

PRICE DETERMINATION: - In a market price of a commodity is decided by the free forces of demand and supply. These free forces of demand and supply act and react in such a manner that the quantity demanded is exactly equal to quantity supplied. In this course price is known as the equilibrium price. Intersection of market demand and market supply curves decides the price of a product.

Market Equilibrium Under perfect competition

Equilibrium price is that price which is determined by market forces of demand and supply. At this price both demand and supply are equal to each other. Diagrammatically it is determined at the point where demand curve and supply curve intersect each other. At this point price is known as equilibrium price and quantity is known as equilibrium quantity

Price (Rs.)	Quantity Demand (Units)	Quantity Supply(Units)
1	50	10
2	40	20
3	**30**	**30**
4	20	40
5	10	50



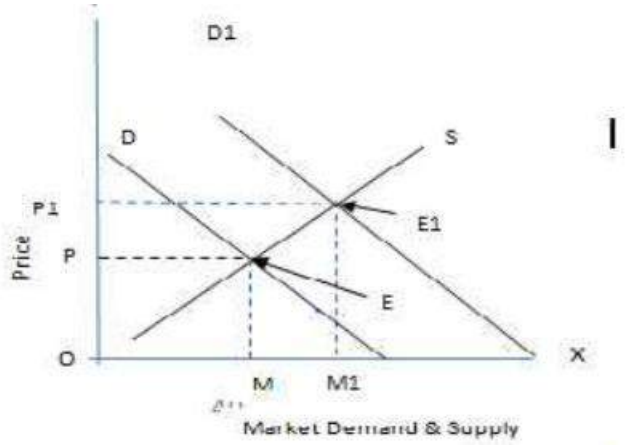
EXCESS DEMAND: - When there is Excess Demand in the market, the competition among the buyers to purchase the required quantity. Hence, they start offering higher prices. With rising market prices, demand contracts and supply expand. This market adjustment continues till the market reaches equilibrium.

EXCESS SUPPLY: - When there is Excess Supply in the market, the competition among the sellers to dispose-of their output. Hence, they start offering lower prices. With fall in the market prices, demand expands and supply contracts. This market adjustment continues till the market reaches equilibrium.

EFFECT OF CHANGES IN DEMAND AND SUPPLY ON MARKET EQUILIBRIUM

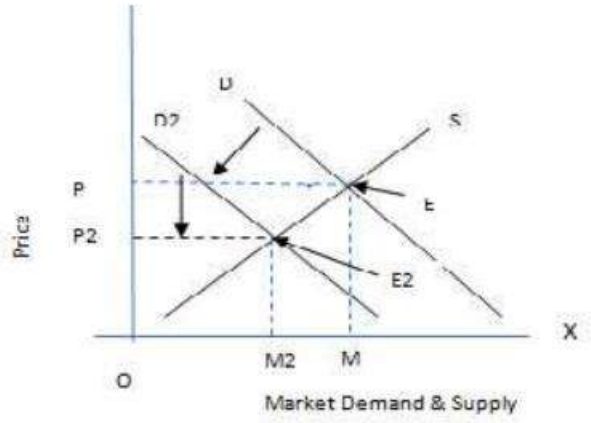
CHANGE IN DEMAND

1. **Increase in Demand**:- In case of increase in demand and supply remain unchanged, demand curve shift to the right



- Increase in demand shift the demand curve from D to D1 to right leading to excess demand E E1 at the given price OP.
- There will be competition among buyers leading to rise in price.
- As price rise supply starts rising (along S) demand starts falling.
- These changes continue till D=S at a new equilibrium at E1
- The quantity rises to OM to OM1 and price rises OP to O

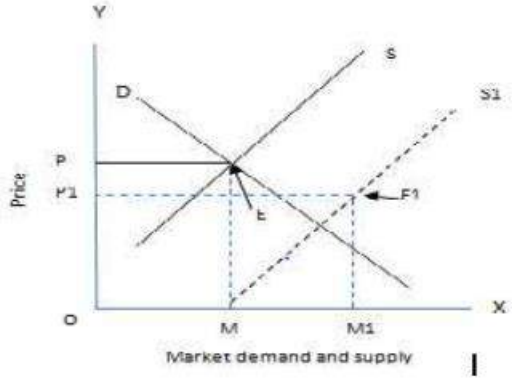
2. **Decrease in demand**: In case of decrease in demand and supply remain unchanged, demand curve shift to the left.



- Decrease in demand shift the demand curve from D to D2 to left leading to decrease demand E E2 at the given price OP.
- There will be competition among buyers leading to fall in price.
- As price falls supply starts falling (along S).
- These changes continue till D=S at a new equilibrium at E2
- The quantity falls to OM to OM2 and price fall OP to OP2.

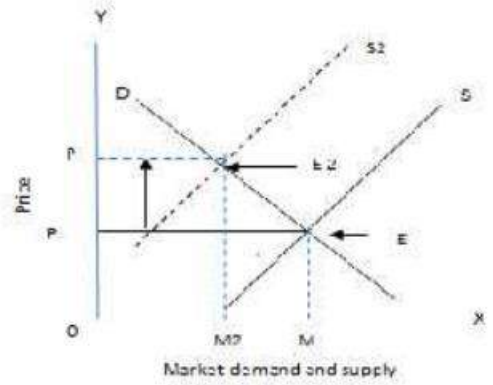
CHANGE IN SUPPLY:

1. **Increase in Supply**: - In case of increase in supply and demand remains unchanged, supply curve shift to the right



- Increase in supply shift the supply curve from S to S1 to right leading to excess supply.
- There will be competition among buyers leading to fall in price.
- As price fall supply starts rising (along D).
- These changes continue till D=S at a new equilibrium at E1'
- The quantity rises to OM to OM1 and price fall OP to OP1

2. **Decrease in supply**: - In case of decrease in supply and demand remains unchanged, the supply curve shifts to the leftward.



- Decrease in supply shift the supply curve from S to S2 to left leading to fall supply E E2 at the given price OP.
- There will be competition among buyers leading to increase in price.
- As price increase supply starts falling (along D).
- These changes continue till D=S at a new equilibrium at E2
- The quantity falls to OM to OM2 and price rises OP to OP2.

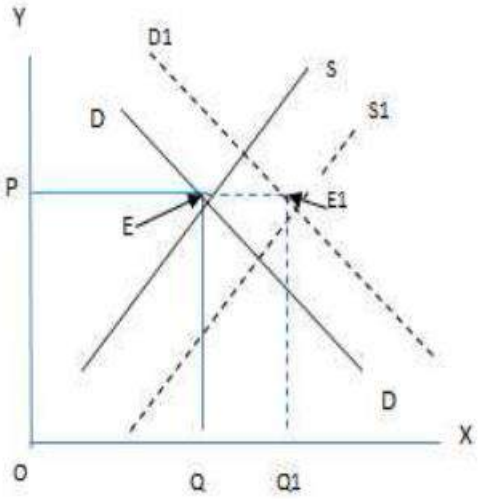
SIMULTANEOUS SHIFT (CHANGE) IN DEMAND AND SUPPLY AND MARKET EQUILIBRIUM

1. SIMULTANEOUS INCREASE IN DEMAND AND SUPPLY

The effect of increase in both demand and supply on equilibrium price and equilibrium quantity depends upon the following changes:

Case 1: Increases in demand = Increase in supply: -

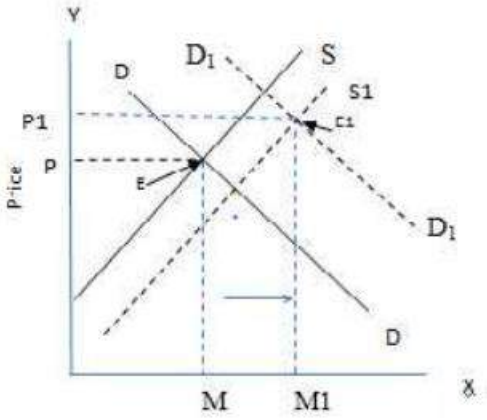
When increase in demand is proportionately equal to increase in supply, then equilibrium price remain same.



The new equilibrium is determined at E1, the equilibrium price remains the same but equilibrium quantity rises from OQ to OQ1.

Case 2: Increases in demand > Increase in supply: -

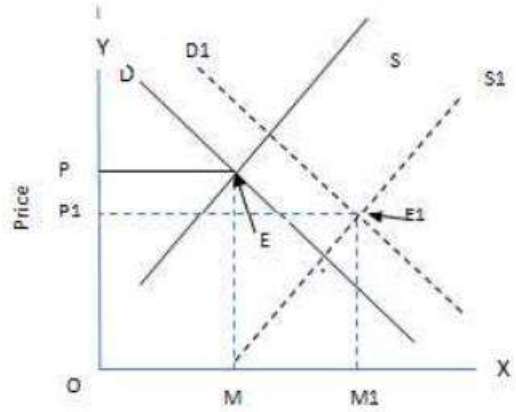
When increase in demand is proportionately more than increase in supply, then equilibrium price and equilibrium quantity both increases.



The new equilibrium is determined at E1,,the equilibrium price increases from OP to OP1and Equilibrium Quantity increases from OM to OM1. Increase in price is less than increase in quantity.

Case 3: Increases in demand < Increase in supply: -

When increase in demand is proportionately less than increase in supply, then equilibrium price falls and equilibrium quantity increases



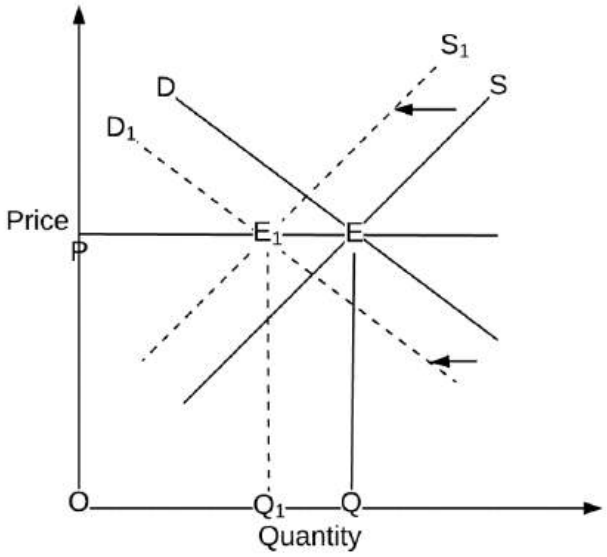
The new equilibrium is determined at E1. The equilibrium price decreases from OP to OP1and Equilibrium Quantity increases from OM to OM1. Decrease in price is less than increase in quantity.

2. SIMULTANEOUS DECREASE IN DEMAND AND SUPPLY

The effect of decrease in both demand and supply on equilibrium price and equilibrium quantity depends upon the following changes;

Case 1: Decreases in demand = Decrease in supply: -

When decrease in demand is proportionately equal to decrease in supply, then equilibrium price remain same.



The new equilibrium is determined at E1, the equilibrium price remains the same but equilibrium quantity decreases from OQ to OQ1.

Case 2: Decreases in demand > Decrease in supply:-

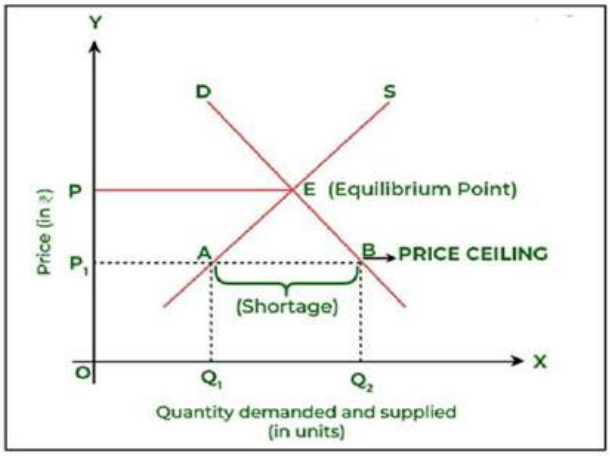
When decrease in demand is proportionately more than decrease in supply, then equilibrium price and equilibrium quantity both decreases. Decrease in price is less than decrease in quantity.

Case 3: Decreases in demand < Decrease in supply:-

When decrease in demand is proportionately less than decrease in supply, then equilibrium price rises and equilibrium quantity decreases. Increase in price is less than decrease in quantity.

SIMPLE APPLICATION TOOLS OF DEMAND AND SUPPLY

Price ceiling: Price ceiling refers to fixing the maximum price of a product at a level lower than the equilibrium price. Often, the government fixes this price much below the equilibrium market price so that the essential commodities are within the reach of the poorer section of the society. In terms of demand and supply curves, price ceiling means fixing price by the government below the equilibrium price when the equilibrium price is presumed to be too high.



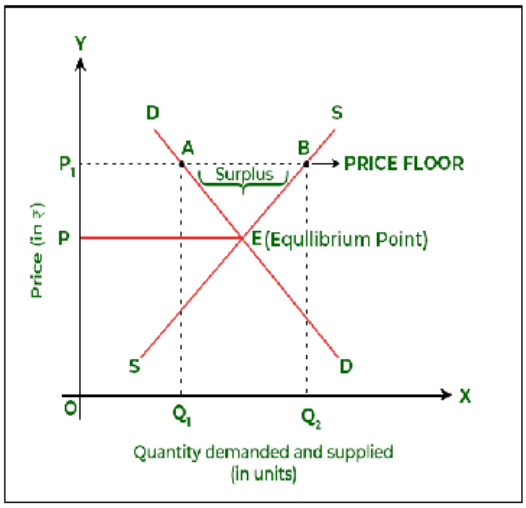
- Price ceiling is generally imposed by the govt. on necessary items wheat, rice, kerosene, sugar, medicines during in times of 'shortages'

Consequences of price ceiling;

1. **Black Marketing**: Black market is any market in which the commodities are sold at a price higher than the maximum price fixed by the Government.
2. **Rationing system**: To meet the excess demand, Government may also enforce the Rationing system.

Price floor or Minimum Support Price (MSP):

Price floor refers to the minimum price, fixed by the Government, which the producers must be paid for their produce. When the government feels that the price fixed by the forces of demand and supply is not remunerative form the point of view, then government fixes a price which is more than equilibrium price. Most well-known examples of imposition of price floor are agricultural price support programme and the minimum wage legislation. These programmes are meant to insulate farmers and labours from income fluctuations resulting from price variations in the free market



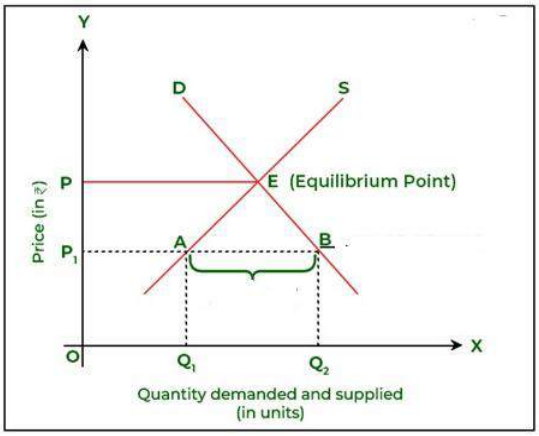
Implications of Price floor: **Buffer stock** is an important tool in the hands of Government to ensure price floor. When government set the price higher than equilibrium price, this leads to excess supply. The government would purchase the commodity at higher price from the farmers or producers so as to maintain buffer stock, which is to be released in case of shortage of commodity.

MULTIPLE CHOICE QUESTIONS:

1. Equilibrium price is determined when;
   (a) Market demand for a commodity is zero
   (b) Market supply for a commodity is zero
   (c) Market demand and Market supply are equal
   (d) Market demand is either more or less than Market supply.
2. When Market demand is more than Market supply, it refers to a situation of:
   (a) Excess supply
   (b) Excess Demand
   (c) Equilibrium level
   (d) None of these
3. _____ refers to the minimum price, fixed by the Government, which is above the equilibrium price.
   (a) Price floor
   (b) Minimum Support Price
   (c) Both (a) and (b)
   (d) None of these
4. Equilibrium price remains the same when:
   (a) Increase in demand = increase in supply
   (b) Decrease in demand = Decrease in supply
   (c) Increase in demand= Decrease in supply
   (d) (both (a) and (b)
5. Which of the following statement is correct in case of non-viable industry?
   (a) Supply curve lies above Demand curve.
   (b) Supply curve lies below demand curve
   (c) Supply curve and Demand curve intersect each other
   (d) Supply curve coincide with Demand curve.

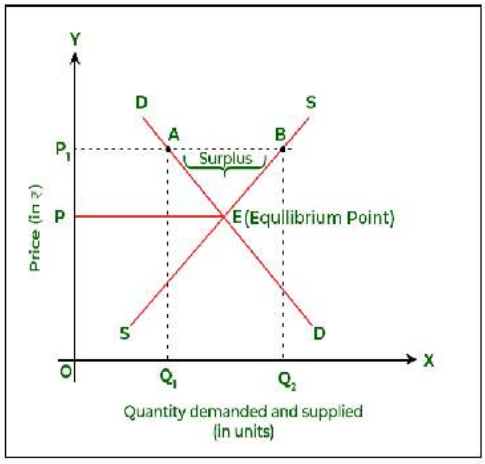
6. Equilibrium price falls and equilibrium quantity rises when:
   (a) Decrease in Demand<Decrease in supply
   (b) Increase in Demand = Increase in supply
   (c) Decrease in demand <increase in supply
   (d) Decrease in demand=Increase in supply.
7. What will be the effect on equilibrium price and equilibrium quantity when income increases in case of normal goods?
   (a) Both equilibrium price and quantity falls
   (b) Both equilibrium price and quantity rise
   (c) Equilibrium price rises and equilibrium quantity falls
   (d) Equilibrium price falls and equilibrium quantity rises.

8. Which of the following situation does not lead to an increase in equilibrium price?
   (a) An increase in demand without any change in supply.
   (b) A decrease in supply accompanied by proportionately equal increase in demand.
   (c) A decrease in supply without a change in demand.
   (d) An increase in supply accompanied by proportionately equal decrease in supply.
9. The following diagram depicts the situation of:



   (a) Excess supply
   (b) Excess demand
   (c) Equilibrium condition
   (d) None of these.
10. The individual demand and supply functions of a product are given as: Dx=10-2Px Sx =20+2Px, where Px stands for price and Dx and Sx respectively stands for quantity demanded and supplied. If there are 4000 consumers and 1000 firms in the market, then equilibrium price will be:
    (a) Rs. 4 (b) Rs.4.25 (c) Rs.3 (d) Rs. 5

11. Government has fixed the price as OP1, while the equilibrium price is OP as seen in the diagram.



The price fixed by the Government is known as:

(a) Price floor (b)Minimum support Price (c)Price ceiling (d) Bothe (a) and (b)

12. In a commodity market, excess demand exists when:
    (a) Market price is greater than equilibrium price
    (b) Equilibrium price is greater than market price
    (c) Equilibrium price is not equal to market price
    (d) Government fixes the price.

ASSERTION AND REASON QUESTIONS:

Read the statements – Assertion (A) and Reason (R). Choose one of the correct alternatives given below:

Alternatives:

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true

13. **Assertion (A)**: Price ceiling is generally imposed on essential items and is fixed below the market determined price,
    Reason (R): The reason is that equilibrium price is too high for the common people to afford.
14. **Assertion (A)**: Minimum wage legislation is an example of imposition of Price ceiling.
    Reason (R): Under Minimum Wage Legislation, minimum wages are set above the equilibrium wage level by the Government.
15. **Assertion (A)**: when supply is perfectly elastic, then change in demand does not affect the equilibrium price.
    Reason (R): When demand is perfectly inelastic, then change in supply does not affect the equilibrium quantity.

16. **Assertion (A)**: Price floor refers to the minimum price, fixed by the Government, which is above equilibrium price
    Reason (R): The need for price floor arises when government finds that equilibrium price is too low for the producers.
17. **Assertion (A)**: To meet excess demand, government may also enforce the Rationing System.
    Reason (R): Rationing is a system adopted by the government to sell the minimum quota of essential commodities at a price more than equilibrium price.

Statement Based Questions:

Read the following statements carefully and choose the correct alternative from the following:

Alternatives:

(a) Both the statements are true.
(b) Both the statements are false.
(c) Statement 1 is true and Statement 2 is false
(d) Statement 2 is true and Statement 1 is false.

18. **Statement1**: In case of viable Industry supply curve and demand curve intersect each other in the positive axes.
    Statement2: In case of a non -viable industry, supply curve always lies above demand curve.
19. **Statement1**: Price floor is also known as support price which is normally fixed below the equilibrium price to protect the producers.
    Statement2: Price ceiling is the Government fixed price, which is normally above the equilibrium price.
20. **Statement1**: When increase in demand is proportionately equal to decrease in supply, then equilibrium price rises.
    Statement2: When decrease in demand is proportionately equal to increase in supply, then equilibrium price falls.
21. **Statement1**: When quantity demanded is more than quantity supplied at the prevailing market price is referred as excess supply
    Statement2: When quantity supplied is more than quantity demanded at the prevailing market price is referred as excess demand.
22. **Statement1**: If both demand and supply increase simultaneously at the same proportion. Then equilibrium price remains the same.
    Statement2: Equilibrium price and equilibrium quantity remain same even with increase or decrease in demand in case of perfectly elastic supply.

CASE BASED QUESTIONS:

Read, the following passage carefully and answer the questions numbers 31-34 on the basis of the same.

Government plays an important role in controlling the prices of essential commodities (wheat, sugar, kerosene etc.) when the equilibrium price determined by free play of demand and supply is too high for the poor people, then government imposes price ceiling. It refers to fixing the maximum price of a commodity at a level lower than the equilibrium price. It is generally imposed on essential items and is fixed below the equilibrium price or market determined price.

Government also intervenes in the process of price determination through price floor. It refers to minimum price (above the equilibrium price), fixed by the government, which the producers must be paid for their produce. When government feels that the price fixed by the forces of demand and supply is not remunerative from the producer's point of view, then it fixes a price above the equilibrium price is known as price floor.

23. Price floor is the price fixed by the government, which is:
    (a) Equal to equilibrium price
    (b) Below the equilibrium price
    (c) Above the equilibrium price
    (d) None of these.
24. Out of 'price floor and price ceiling' which concept is used by the government to control the prices of essential commodities?
25. In the recent Government budget, government has made an announcement to increase the Minimum Support Price (MSP) of Rubber from Rs.150/per kg to Rs.200/ per kg. What will be the direct effect on supply of rubber in the country?
    (a) Supply increases
    (b) Supply decreases
    (c) Supply remains unchanged
    (d) None of these
26. What will be the important tool in the hands of Government to ensure price floor?

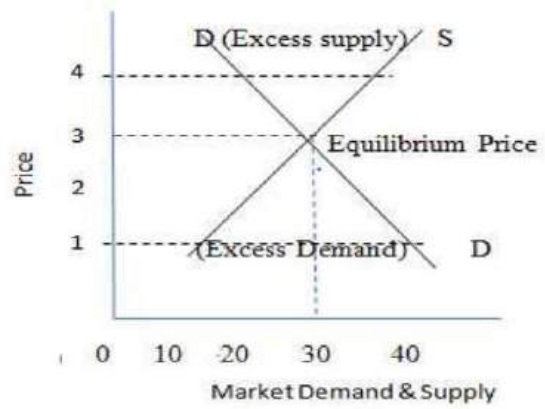
SHORT ANSWER TYPE QUESTIONS:

27. Explain the process of price determination under perfect competition with the help of schedule and a diagram.

Ans:-

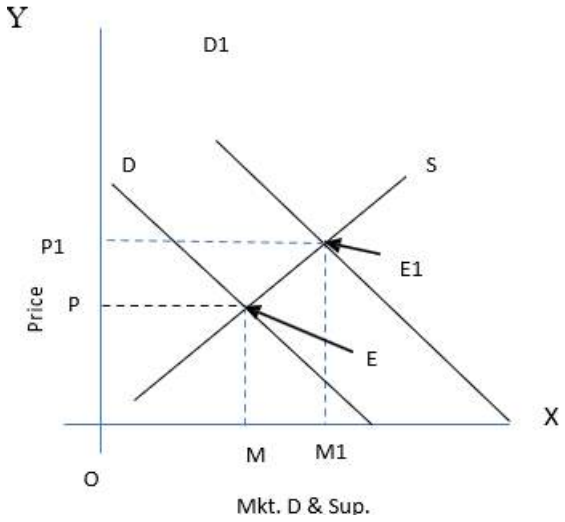
Equilibrium price is that price which is determined by market forces of demand and supply. At this price both demand and supply are equal to each other. Diagrammatically it is determined at the point where demand curve and supply curve intersect each other. At this point price is known as equilibrium price and quantity is known as equilibrium quantity.

Price (Rs.)	Quantity Demand (Units)	Quantity Supply (Units)	Remarks
1	50	10	Excess Demand
2	40	20	Excess Demand
3	30	30	Equilibrium
4	20	40	Excess Supply
5	10	50	Excess Supply



28. Market for a good is in equilibrium. There is increase in demand for the goods. Explain the chain effect of this change.

Ans.



- Increase in demand shift the demand curve from D to D1 to right leading to excess demand E E1 at the given price OP.
- There will be competition among buyers leading to rise in price.
- As price rise supply starts rising (along S) demand starts falling.
- These changes continue till D=S at a new equilibrium at E1
- The quantity rises to OM to OM1 and price rises OP to OP1

29. Suppose the demand and supply curves of a commodity X are given by the following two equations simultaneously.

Qd=200-P Qs=50+2P

a) Find the equilibrium price and equilibrium quantity.
b) Suppose, due to change in prices of factors producing commodity, the new supply curve is given by Qs'=80+2P, find the new equilibrium price and quantity?

Ans:

(a) As we know that Market is in equilibrium

Qd = Qs

200-P= 50+2P

(-) 3P= (-)150

Therefore, equilibrium price **= 50** and equilibrium quantity =200-50 = **150**

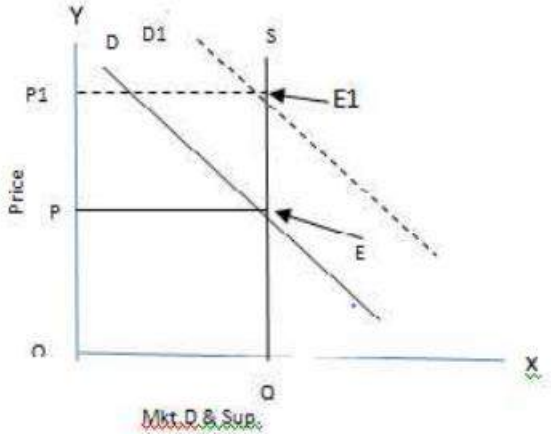
(b) Under new price market is in equilibrium Qd=Qs'

200-P= 80+2P

(-)3P = (-)120 P= **40** quantity =200-40=**160**

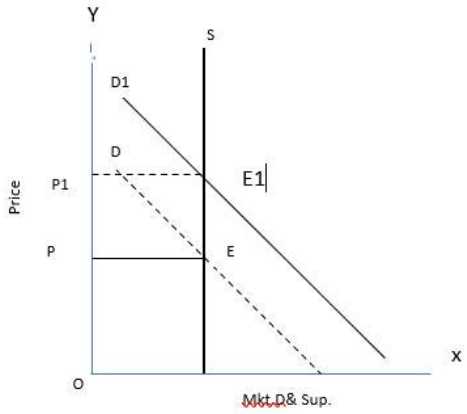
30. Show with the help of diagram the effect on equilibrium price and quantity when supply is perfectly inelastic and demand increases and decreases?

Ans:



When supply is perfectly inelastic and demand increases. Demand curve shift to towards right. The new demand curve D1 intersects the supply curve at point E1.

Result: Price increases from OP to OP1 and quantity demand remains unchanged.



When supply is perfectly inelastic and demand decreases. Demand curve shift to towards left. The new demand curve D1 intersects the supply curve at point E1.

Result: Price decreases from OP to OP1 and quantity demand remains unchanged

31. Market for a good is in equilibrium. There is simultaneous decrease both in demand and supply but there is no change in price. Explain how it is possible. Use schedule.
Ans: A simultaneous decrease in both demand and supply may not influence the market price. This can be illustrated with the help of following schedule.

Price(Rs)	Qty demanded (Kg)	Qty. Supplied (Kg)	New Qty. Demanded(kg)	New Qty. Supplied (Kg)
1	100	20	50	10
2	80	40	40	20
3	**60**	**60**	**30**	**30**
4	40	80	20	40
5	20	100	10	50

Above schedule, it is clear that at price Rs.3, the market demand is equal to market supply of 60 Units. Hence at Rs. 3, the market is in equilibrium. For market price to remain unchanged. decrease in demand should be exactly equal to decrease in supply.

32. There are 1000 identical individual buyers in the market for commodity X, each with demand function as Qdx=12 -2Px and 100 identical producers each with supply function as Qsx = 20Px.
    (a) Find the market demand function and market supply function of commodity X
    (b) Calculate equilibrium price and equilibrium quantity.
    (c) Suppose the Government decided to collect a tax of Rs,2/ unit sold from each of 100 sellers. What effect this will have on the equilibrium price and equilibrium quantity.

    Ans.

    (a) Market demand function =1000(12 – 2Px) = 12000 – 2000Px.
    Market supply function = 100(20Px) = 2000Px

    (b) At market equilibrium, MDx = MSx =12000-2000Px = 2000Px)
    Px = **Rs.3/**
    Putting the equilibrium price Rs 3/ market demand function
    12000-2000 x 3 = **6000 units**.

    (c) When tax of Rs 2/ unit is collected from each seller, then new equilibrium price becomes Px -2
    New market supply function is = 2000(px – 2) = 2000Px – 4000
    Equilibrium means 12000 – 2000Px = 2000Px – 4000
    New price **Rs.4/.**
    Putting the new price in demand function= 12000-2000 x4= **4000units**
    The new equilibrium price Rs 4/ and new equilibrium quantity 4000units
    Thus, equilibrium price increases equilibrium quantity falls due to new tax.

33. Do you agree with the view that buffer stock is a tool of price floor?
Ans:
It is true that buffer stock is an important tool of price floor. Price floor is the minimum price fixed by the government for sale of a commodity in the market. Often this is higher than the equilibrium price. Generally, it is done in case of agriculture goods with a view to support of farmers. However, floor price is often supplemented with the Support Price Policy. This implies that the Government will buy the surplus stock of the farmers in case they fail to sell it in the open market. By buying the

surplus stock of farmers, the Government creates buffer stock. Thus, buffer stock is a tool of price floor.

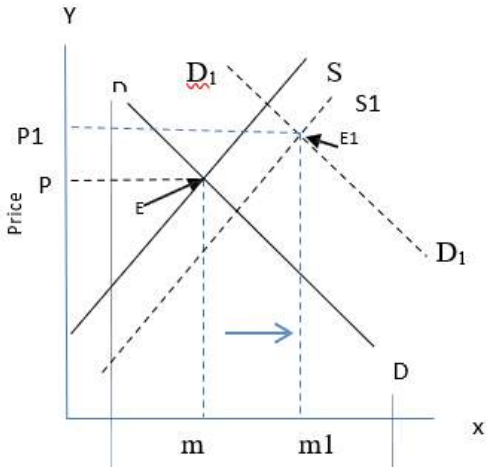
34. Farmers may suffer a loss even when there is a good Harvest. Does your supply-demand analysis answer to this paradox?
Ans:
Due to poverty or immediate need of cash farmers are often driven to a distressed sale of their produce. Accordingly good harvest often leads to excess supply in the market. This causes a price-crash. The price may fall to such an extent that the total revenue of the farmer decreases even when his output is more than before.

Long answer questions:

35. Equilibrium price may or may not change with shifts in both demand and supply curve. Comment.

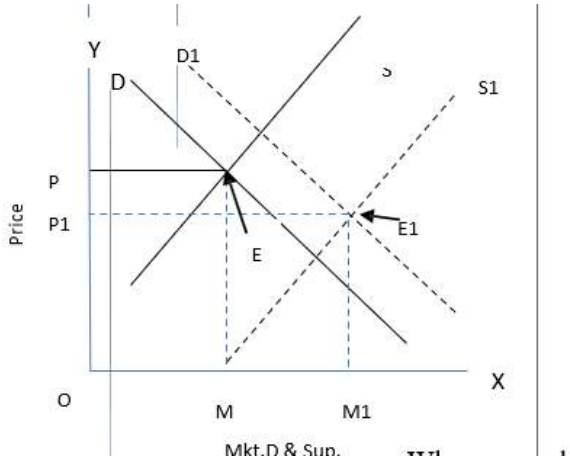
Ans: - There can be 3 situations of a simultaneous right wards shift of supply curve and demand curve.

i) When demand increases more than supply, then equilibrium price and equilibrium quantity both will increase.



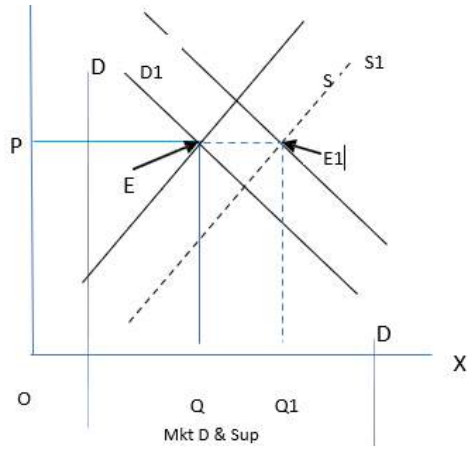
When increase in demand is more than increase in supply, price increases from OP to OP1. Quantity increases from OM to OM1. Increase in price is less than increase in quantity.

ii) When demand increases less than supply, then equilibrium price will fall but equilibrium quantity will rise.



When supply increases more than demand, then equilibrium price falls from OP to OP1 and equilibrium quantity increases from OM to OM1. Decrease in price is less than increase in quantity.

iii) When demand and supply increase simultaneously at the same proportion, then equilibrium price remains same only equilibrium quantity increases.



When increase in demand is equal to increase in supply, then equilibrium price remains unchanged at OP. Equilibrium Quantity increases from OQ to OQ1.

ANSWERS:

1 (c)
2(b)
3(c)
4(d)
5(a)
6(c)
7(b)
8(d)
9 (b)
10(c)
11(c)
12(a)
13.Price ceiling
14.Buffer stock
15.Sellers
16.2, 46
17.falls and rises
18. Minimum Support Price.

19.Black marketing
20. Rises and falls
21(a)
22(d)
23(b)
24 (a)
25 (c)
26(a)
27(b)
28(a)
29(b)
30 (c)
31(c)
32 price ceiling
33(a)
34. Buffer stocks.

SOLVED SAMPLE QUESTION PAPERS

SAMPLE QUESTION PAPER -1
ECONOMICS (030)
CLASS XI

TIME: 3 HOURS

M.M. – 80

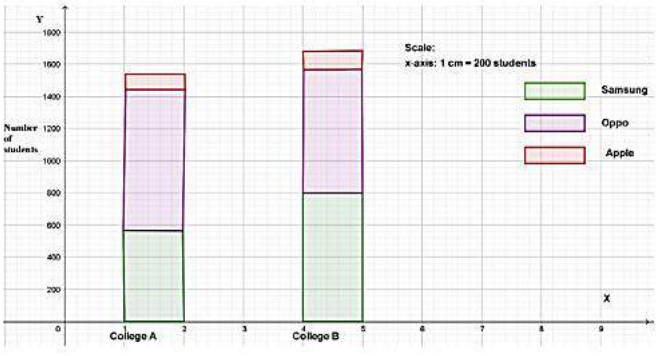
GENERAL INSTRUCTIONS:

1. This question paper contains two sections:
Section A – Statistics
Section B – Micro Economics
2. This paper contains 20 Multiple Choice Questions type questions of 1 mark each.
3. This paper contains 4 Short Answer type questions of 3 marks each to be answered in 60 to 80 words.
4. This paper contains 6 Short Answer type questions of 4 marks each to be answered in 80 to 100 words.
5. This paper contains 4 Long Answer type questions of 6 marks each to be answered in 100 to 150 words.

सामान्य निर्देश:

1. इस प्रश्न पत्र में दो खंड हैं:
खंड ए - सांख्यिकी
खंड बी - सूक्ष्म अर्थशास्त्र
2. इस पेपर में 20 बहुविकल्पीय प्रश्न हैं, जिनमें से प्रत्येक 1 अंक का है।
3. इस पेपर में 4 लघु उत्तरीय प्रश्न हैं, जिनमें से प्रत्येक 3 अंक का है, जिनका उत्तर 60 से 80 शब्दों में देना है।
4. इस पेपर में 6 लघु उत्तरीय प्रश्न हैं, जिनमें से प्रत्येक 4 अंक का है, जिनका उत्तर 80 से 100 शब्दों में देना है।
5. इस पेपर में 4 दीर्घ उत्तरीय प्रश्न हैं, जिनमें से प्रत्येक 6 अंक का है, जिनका उत्तर 100 से 150 शब्दों में देना है।

Q NO	SECTION A- STATISTICS	MARKS
1	Which of the following is a Non-economic Activity? (a) Conductor selling tickets in the bus (b) Teacher teaching his own child (c) Chef cooking food at a hotel (d) Doctor attending to a patient at his Clinic. निम्नलिखित में से कौन सी गैर-आर्थिक गतिविधि है? (अ) बस में टिकट बेचने वाला कंडक्टर (ब) अपने बच्चे को पढ़ाने वाला शिक्षक (सी) होटल में खाना बनाने वाला शेफ (डी) अपने क्लिनिक में रोगी का इलाज करने वाला डॉक्टर	1
2	When we want to classify the data in numerical terms, which method of classification of data is used? (a)Qualitative classification (b) Quantitative classification (c) Chronological classification (d) Conditional classification	1

	संख्यात्मक शब्दों में डेटा को वर्गीकृत करने के लिए कौन सा डेटा वर्गीकरण का तरीका प्रयुक्त किया जाता है? (अ) गुणात्मक वर्गीकरण (ब) संख्यात्मक वर्गीकरण (सी) कालजयी वर्गीकरण (डी) शर्ताधीन वर्गीकरण	
3	Which of the following is not a characteristic of the mean? (a) It is affected by extreme scores. (b) It is best used with ordinal data. (c) It minimizes the sum of squared deviations. (d) The sum of the deviations about the mean is 0. or The _____ of a sample is the middle value when the data are arranged in ascending or descending rank order. (a) Mode (b) Mean (c) Median (d) Range निम्नलिखित में से माध्य की कौन-सी विशेषता सही नहीं है? ए. इसे अत्यधिक स्कोरों से प्रभावित किया जाता है। ब. इसे सर्वोत्तम तरीके से क्रमांकीय डेटा के साथ उपयोग किया जाता है। सी. यह वर्गीकृती के वर्गीकरण की समीक्षा करता है। डी. माध्य के बारे में शून्य होते हुए अपवादों का योग है। या नमूने का _____ उस मध्य अंक को कहते हैं जब डेटा को आरोही या अवरोही क्रम में व्यवस्थित किया जाता है। क. मोड ख. मीन ग. माध्य घ. सीमा	1
4	Identify the diagram: आरेख को पहचानें  a) Multiple bar diagram b) Compound bar diagram c) Sub-divided bar diagram d) Percentage bar diagram	1

	ए) मल्टीपल बार डायग्राम बी) कंपाउंड बार डायग्राम सी) उप-विभाजित बार आरेख डी) प्रतिशत बार आरेख	
5	If Correlation coefficient γ xy = Zero , then variable X and Y are: (a) Linearly related (b) Not linearly related (c) Independent (d) All of the above यदि सहसंबंध गुणांक γ xy = शून्य है, तो चर X और Y हैं: (ए) रैखिक रूप से संबंधित (बी) रैखिक रूप से संबंधित नहीं (सी) स्वतंत्र (डी) उपरोक्त सभी	1
6	Read the statements carefully and choose the correct alternative among those given below; **Statement 1: In case of perfect positive correlation, the degree of correlation lies between +0.75 and +1** **Statement 2: When the degree of correlation of two series is very small, it is called low degree of correlation** Alternatives: (a) Both the statements are True (b) Both the statements are False (c) Statement 1 is True and Statement 2 is False (d) Statement 2 is True and Statement 1 is False ठीक से पढ़ें और दिए गए विकल्पों में से सही विकल्प चुनें; कथन 1: पूर्ण सकारात्मक संबंध की स्थिति में, संबंध का मात्रा +0.75 से +1 के बीच होता है। कथन 2: जब दो श्रृंखलाओं का संबंध बहुत कम होता है, तो इसे कम संबंध की स्थिति कहा जाता है। विकल्प: (अ) दोनों कथन सही हैं (ब) दोनों कथन गलत हैं (सी) कथन 1 सही है और कथन 2 गलत है (डी) कथन 2 सही है और कथन 1 गलत है	1
7	While computing median in a continuous series, the following formula is used $M = l_1 + \frac{n/2 - cf}{f} \times c$ In the given formula, l_1 represents a. Lower limit of the median class b. Class interval of the median class c. Upper limit of the median class d. None of these एक सतत श्रृंखला में माध्यिका की गणना करते समय, निम्नलिखित सूत्र का उपयोग किया जाता है, $M = l_1 + \frac{n/2 - cf}{f} \times c$ दिए गए सूत्र में दर्शाया गया है a) माध्यिका वर्ग की निचली सीमा b) माध्यिका वर्ग का वर्ग अंतराल c) माध्यिका वर्ग की ऊपरी सीमा d) इनमें से कोई नहीं	1
8	Read the following statements – Assertion (A) and Reason (R). Choose one of the correct alternatives given below:	1

	Assertion (A): Price of a commodity and its quantity demanded is negatively correlated. **Reason (R): The correlation is negative when variable move in opposite directions** a) Both Assertion (A) and Reason(R) are true and Reason (R) is the correct explanation of Assertion (A). b) Both Assertion (A) and Reason(R) are true and Reason (R) is not the correct explanation of Assertion (A). c) Assertion (A) is true but Reason(R) is false d) Assertion (A) is false but Reason (R) is true निम्नलिखित कथनों को पढ़ें - अभिकथन (A) और कारण (R)। नीचे दिए गए सही विकल्पों में से एक चुनें: अभिकथन (A): किसी वस्तु की कीमत और उसकी माँग की गई मात्रा में नकारात्मक संबंध होता है। कारण (R): जब चर विपरीत दिशाओं में चलते हैं तो सहसंबंध नकारात्मक होता है a) अभिकथन (A) और कारण (R) दोनों सत्य हैं और कारण (R) अभिकथन (A) की सही व्याख्या है। b) अभिकथन (A) और कारण (R) दोनों सत्य हैं और कारण (R) अभिकथन (A) की सही व्याख्या नहीं है। c) अभिकथन (A) सत्य है लेकिन कारण (R) असत्य है d) अभिकथन (A) असत्य है लेकिन कारण (R) सत्य है	
9	Read the following statements – Assertion (A) and Reason (R). Choose one of the correct alternatives given below: Assertion (A): Non- sampling errors are more serious than sampling error. Reason (R): Non – sampling error can be minimized by taking larger sample. a) Both Assertion (A) and Reason(R) are true and Reason (R) is the correct explanation of Assertion (A). b) Both Assertion (A) and Reason(R) are true and Reason (R) is not the correct explanation of Assertion (A). c) Assertion (A) is true but Reason(R) is false d) Assertion (A) is false but Reason (R) is true. निम्नलिखित कथनों को पढ़ें - अभिकथन (A) और कारण (R)। नीचे दिए गए सही विकल्पों में से एक चुनें: अभिकथन (A): गैर-नमूना त्रुटियाँ नमूना त्रुटि से अधिक गंभीर हैं। कारण (R): बड़ा नमूना लेकर गैर-नमूना त्रुटि को कम किया जा सकता है। a) अभिकथन (A) और कारण (R) दोनों सत्य हैं और कारण (R) अभिकथन (A) का सही स्पष्टीकरण है। b) अभिकथन (A) और कारण (R) दोनों सत्य हैं और कारण (R) अभिकथन (A) का सही स्पष्टीकरण नहीं है।c) अभिकथन (A) सत्य है लेकिन कारण (R) असत्य है d) अभिकथन (A) असत्य है लेकिन कारण (R) सत्य है।	1
10	Base year is also known as : (a) Current Year (b) Reference Year (c) both (a) and (b) (d) Periodic Year आधार वर्ष को इस नाम से भी जाना जाता है..... (a) चालू वर्ष (b) संदर्भ वर्ष (c) (a) और (b) दोनों (d) आवधिक वर्ष	1
11	Read the following text carefully and answer question given below. We frequently see index numbers, such as the Consumer Price Index (CPI), in our daily life. Economists often use the index numbers to compare values measured at	3

	different points in time. Using an index can make quick comparisons easy. The index numbers have become a widely accepted statistical device for measuring business activity changes. A typical use of the index number technique in business is to summarize complex situations, with a single performance index so that a dashboard (or report) would have enough space to show all CPIs. An index number is used to measure changes in the magnitude of a variable or group of variables regarding time, geographical location, or other characteristics such as profession. IT professionals who need to analyse economic and business activities, but have limited experience in statistics, want to learn how to construct and interpret performance indexes. Index numbers are also not free from criticism as its base year and commodity selection requires a lot of attention and expert attention. निम्नलिखित पाठ को ध्यान से पढ़ें और नीचे दिए गए प्रश्न का उत्तर दें। हम अपने दैनिक जीवन में अक्सर उपभोक्ता मूल्य सूचकांक (CPI) जैसे सूचकांक संख्याएँ देखते हैं। अर्थशास्त्री अक्सर समय के विभिन्न बिंदुओं पर मापे गए मूल्यों की तुलना करने के लिए सूचकांक संख्याओं का उपयोग करते हैं। सूचकांक का उपयोग करके त्वरित तुलना करना आसान हो सकता है। सूचकांक संख्याएँ व्यावसायिक गतिविधि परिवर्तनों को मापने के लिए एक व्यापक रूप से स्वीकृत सांख्यिकीय उपकरण बन गई हैं। व्यवसाय में सूचकांक संख्या तकनीक का एक विशिष्ट उपयोग जटिल स्थितियों को एक एकल प्रदर्शन सूचकांक के साथ सारांशित करना है ताकि डैशबोर्ड (या रिपोर्ट) में सभी CPI दिखाने के लिए पर्याप्त स्थान हो। सूचकांक संख्या का उपयोग समय, भौगोलिक स्थान या पेशे जैसी अन्य विशेषताओं के संबंध में चर या चर के समूह के परिमाण में परिवर्तन को मापने के लिए किया जाता है। आईटी पेशेवर जिन्हें आर्थिक और व्यावसायिक गतिविधियों का विश्लेषण करने की आवश्यकता है, लेकिन सांख्यिकी में सीमित अनुभव है, वे प्रदर्शन सूचकांक का निर्माण और व्याख्या करना सीखना चाहते हैं। सूचकांक संख्याएँ भी आलोचना से मुक्त नहीं हैं क्योंकि इसके आधार वर्ष और वस्तु चयन के लिए बहुत अधिक ध्यान और विशेषज्ञ ध्यान की आवश्यकता होती है। What is an index number? What are the uses of Index Numbers? सूचकांक संख्या क्या है? सूचकांक संख्याओं के क्या उपयोग हैं?	
12	The construction of questionnaire is a specific art. The framing of questions and overall drafting of a questionnaire have strong bearing upon the quality of the questionnaire. Explain the principles that should be followed while drafting the questionnaire. OR What makes Census method more suitable than sample survey method, in Population Census? प्रश्नावली का निर्माण एक विशिष्ट कला है। प्रश्नों का निर्माण और प्रश्नावली का समग्र प्रारूपण प्रश्नावली की गुणवत्ता पर गहरा प्रभाव डालता है। उन सिद्धांतों की व्याख्या करें जिनका प्रश्नावली तैयार करते समय पालन किया जाना चाहिए। या जनसंख्या जनगणना में जनगणना पद्धति को नमूना सर्वेक्षण पद्धति से अधिक उपयुक्त क्या बनाता है?	3
13	Find AM from the following data. निम्नलिखित आंकड़ों से AM ज्ञात कीजिए। X: 100-200 | 200-300 | 300-400 | 400-500 | 500-600 F: 10 | 18 | 12 | 20 | 40	4
14	a) Define diagrammatic presentation of data. b) What kind of diagrams are more effective in representing the following? (a) Monthly rainfall in a year (b) Composition of the population of Delhi by religion	4

(c) Components of cost in a factory
क) आंकड़ों की आरेखीय प्रस्तुति को परिभाषित करें।
ख) निम्नलिखित को दर्शाने में किस प्रकार के आरेख अधिक प्रभावी हैं?
(क) एक वर्ष में मासिक वर्षा
(ख) धर्म के अनुसार दिल्ली की जनसंख्या की संरचना
(ग) एक कारखाने में लागत के घटक

15 Compute Mode Graphically. 4
ग्राफ़िक रूप से गणना मोड.

Age	0-10	10-20	20-30	30-40	40-50
No of person	2	5	7	5	2

Or

Construct a frequency curve with help of Histogram.
हिस्टोग्राम की सहायता से एक आवृत्ति वक्र का निर्माण करें।

Profit (Rs lakh)	0-20	20-40	40-60	60-80	80-100
Firm A	10	20	40	15	15

16 a) Define Median and Mode 6
b) Find the Median from the following.
a) माध्यिका और मोड को परिभाषित करें
b) निम्नलिखित में से माध्यिका ज्ञात करें।

X	0-10	10-20	20-40	40-60	60-80	80-100
F	8	10	22	25	10	5

17 Calculate Spearman's Rank Correlation Coefficient from the following data 6
निम्नलिखित डेटा से स्पीयरमैन रैंक सहसंबंध गुणांक की गणना करें

Applicant	A	B	C	D	E	F	G	H	I	J
J Reasoning Test	35	90	70	40	95	45	60	85	80	50
Aptitude Test	45	70	65	30	90	40	50	75	85	60

OR

Calculate the coefficient of Correlation for the following data.
निम्नलिखित आँकड़ों के लिए सहसंबंध गुणांक की गणना करें।

X	22	15	20	22	24	28	30
Y	6	8	10	12	14	16	18

SECTION B- MICRO ECONOMICS

18 Darshit is working at a salary of ₹70,000 per month. He receives two job offers: 1
a. To work as an accountant at a salary of ₹60,000 per month
b. To work as a sales manager at a salary of ₹50,000 per month.
In the given case, his opportunity cost will be:
a) ₹50,000 b) ₹60,000 c) ₹70,000 d) ₹1,30,000
or

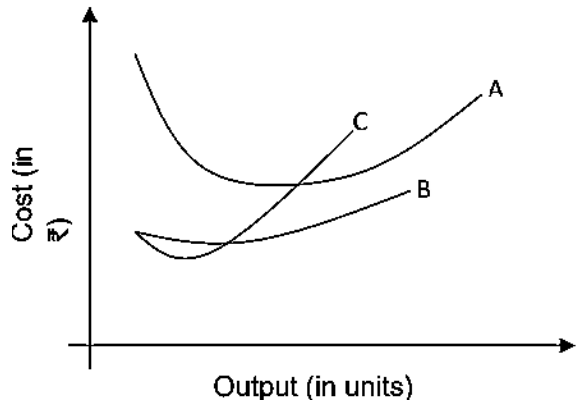
	The government of India decided to produce 1,000 million quintals of wheat this year. The decision regarding quantity of production is a part of which central problem of the economy? (a) What to produce (b) How to produce (c) For whom to produce (d) None of these दर्शित ₹70,000 प्रति माह के वेतन पर काम कर रहा है। उसे दो नौकरी के प्रस्ताव मिलते हैं: a. ₹60,000 प्रति माह के वेतन पर अकाउंटेंट के रूप में काम करना b. ₹50,000 प्रति माह के वेतन पर सेल्स मैनेजर के रूप में काम करना। दिए गए मामले में, उसकी अवसर लागत होगी: a) ₹50,000 b) ₹60,000 c) ₹70,000 d) ₹1,30,000 या भारत सरकार ने इस वर्ष 1,000 मिलियन क्विंटल गेहूं का उत्पादन करने का निर्णय लिया है। उत्पादन की मात्रा के बारे में निर्णय अर्थव्यवस्था की किस केंद्रीय समस्या का हिस्सा है? (a) क्या उत्पादन करना है (b) कैसे उत्पादन करना है (c) किसके लिए उत्पादन करना है (d) d) इनमें से कोई नहीं	
19	In case of perfect competition, a firm is in equilibrium when: (a) MC = MR (b) MC cuts MR from below (c) MC is rising when it cuts MR (d) All of these पूर्ण प्रतिस्पर्धा के मामले में, एक फर्म संतुलन में होती है जब: (a) MC = MR (b) MC नीचे से MR को काटता है (c) MC बढ़ रहा है जब यह MR को काटता है (d) ये सभी	1
20	From the set of change in supply given in column I and corresponding relevant term given in column II, choose the correct pair of statement. कॉलम I में दिए गए आपूर्ति में परिवर्तन के सेट और कॉलम II में दिए गए संगत प्रासंगिक शब्द से, कथनों की सही जोड़ी चुनें।	1

	Column I		Column II
A	Supply increases due to rise in price	i	Contraction in supply
B	Supply decreases due to fall in price	ii	Decrease in supply
C	Supply increases due to fall in price of substitutes	iii	Increase in supply
D	Supply decreases due to fall in price of complementary good	iv	Expansion in supply

	(a) A –i b) B –ii c) C –iii d) D - iv	
21	Consumer equilibrium in case of two commodities(say X and Y) is struck when: (a) MUx/Px= MUm (b)MUx/Px>MUy/Py (c) MUx/Px = MUy/Py = Mum (d)MUx/Px दो वस्तुओं (मान लीजिए X और Y) के मामले में उपभोक्ता संतुलन तब स्थापित होता है जब: (a) MUx/Px= MUm (b)MUx/Px>MUy/Py (c) MUx/Px = MUy/Py = Mum (d)MUx/Px	1
22	Read the following statements carefully and choose the correct alternative from the following **Statement 1: Under perfect competition firm is a price taker.** **Statement 2: In the perfectly competitive market MR is less than AR.** (a) Statement 1 is true and statement 2 is false. (b) Statement 1 is false and statement 2 is true. (c) Both statements 1 and 2 are true (d) Both statements 1 and 2 are false निम्नलिखित कथनों को ध्यानपूर्वक पढ़ें और निम्नलिखित में से सही विकल्प चुनें। कथन 1: पूर्ण प्रतिस्पर्धा के तहत फर्म कीमत लेने वाली होती है। कथन 2: पूर्ण प्रतिस्पर्धी बाजार में MR, AR से कम होता है। (a) कथन 1 सत्य है और कथन 2 असत्य है। (b) कथन 1 असत्य है और कथन 2 सत्य है। (c) कथन 1 और 2 दोनों सत्य हैं (d) कथन 1 और 2 दोनों असत्य हैं	1
23	A balloon seller has decided that he will sell all his balloon at a fixed price of ₹. 10 each. In such a case TR curve will be: (a) Horizontal straight line parallel to the X axis (b) Vertical Straight line parallel to the Y axis (c) Positively sloped straight line passing from the origin (d) Downward sloping straight line एक गुब्बारा विक्रेता ने तय किया है कि वह अपने सभी गुब्बारे ₹10 प्रति गुब्बारे की निश्चित कीमत पर बेचेगा। ऐसी स्थिति में TR वक्र होगा: (a) X अक्ष के समानांतर क्षैतिज सीधी रेखा (b) Y अक्ष के समानांतर ऊर्ध्वाधर सीधी रेखा (c) मूल बिंदु से गुजरने वाली धनात्मक ढलान वाली सीधी रेखा (d) नीचे की ओर ढलान वाली सीधी रेखा	1
24	The Coefficient of Es of a commodity is 0.4. What percentage change in supply will take place if its price rises by 20%. (a) 10% (b) -8% (c) 8% (d) -10% किसी वस्तु का Es गुणांक 0.4 है। यदि इसकी कीमत 20% बढ़ जाती है तो आपूर्ति में कितने प्रतिशत परिवर्तन होगा? (a) 10% (b) -8% (c) 8% (d) -10%	1
25	Out of the following costs, which cost can never be zero: (a) AFC b) TFC c) TVC d) None of these निम्नलिखित लागतों में से कौन सी लागत कभी शून्य नहीं हो सकती: (a) AFC b) TFC c) TVC d) इनमें से कोई नहीं	1

26	Read the following statements carefully: **Statement 1: Bundles which cost more than consumer's money income lie outside the budget line** **Statement 2: Budget set is a narrow concept as compared to budget line** In the light of the given statements, choose the correct alternative from the following: a) Statement 1 is true and statement 2 is false b) Statement 1 is false and statement 2 is true c) Both statements 1 and 2 are true d) Both statements 1 and 2 are false निम्नलिखित कथनों को ध्यानपूर्वक पढ़ें: कथन 1: उपभोक्ता की आय से अधिक लागत वाले बंडल बजट रेखा से बाहर होते हैं कथन 2: बजट रेखा की तुलना में बजट सेट एक संकीर्ण अवधारणा है दिए गए कथनों के आलोक में, निम्नलिखित में से सही विकल्प चुनें: a) कथन 1 सत्य है और कथन 2 असत्य है b) कथन 1 असत्य है और कथन 2 सत्य है c) कथन 1 और 2 दोनों सत्य हैं d) कथन 1 और 2 दोनों असत्य हैं	1
27	When at price of Rs. 5per unit of a commodity, A's demand is for 11 units, B's demand is for 14 units and C'S demand is for 8 units, then market demand will be: (a) 11 units (b) 14 units (c) 17 units (d) 33 units जब किसी वस्तु की 5 रुपये प्रति इकाई की कीमत पर, A की मांग 11 इकाइयों की है, B की मांग 14 इकाइयों की है और C की मांग 8 इकाइयों की है, तो बाजार मांग होगी: (a) 11 इकाइयाँ (b) 14 इकाइयाँ (c) 17 इकाइयाँ (d) 33 इकाइयाँ	1
28	"Is a firm under perfect competition a price taker, or a price maker?" Justify your answer. OR Market for a good is in equilibrium. There is an increase in demand for these goods. Explain the chain of effects of this change. "क्या पूर्ण प्रतिस्पर्धा के अंतर्गत एक कंपनी मूल्य स्वीकारक होती है, या मूल्य निर्माता?" आपका उत्तर समर्थित कीजिए। या किसी वस्तु का बाजार संतुलन में है। इन सामानों की मांग में बढ़ोतरी हो रही है. इस परिवर्तन के प्रभावों की श्रृंखला को समझाइये।	3
29	Services at Ayushman Bharat– Health and Wellness Centres (AB-HWCs) are free and universal to all individuals residing in the service area. Sl. No. AB-PMJAY provides health coverage of up to Rs 5.00 lakh per family per year to 10.74 crore poor, deprived families as per Socio Economic Caste Census (SECC) database. Explain the effect of the above on the Production Possibility Curve of India. Use appropriate diagram for explanation. आयुष्मान भारत-स्वास्थ्य एवं आरोग्य केन्द्रों (एबी-एचडब्ल्यूसी) में सेवाएं निःशुल्क हैं तथा सेवा क्षेत्र में रहने वाले सभी व्यक्तियों के लिए सार्वभौमिक हैं। क्रम संख्या एबी-पीएमजेएवाई सामाजिक आर्थिक जाति जनगणना (एसईसीसी) डेटाबेस के अनुसार 10.74 करोड़ गरीब, वंचित परिवारों को प्रति वर्ष प्रति परिवार 5.00 लाख रुपये तक का स्वास्थ्य कवरेज प्रदान करता है।	3

	भारत के उत्पादन संभावना वक्र पर उपरोक्त के प्रभाव की व्याख्या करें। स्पष्टीकरण के लिए उपयुक्त आरेख का उपयोग करें।	
30	Read the following text carefully and answer question given below: The government may decide that the equilibrium price is not high enough and is causing social problems. For instance, the American farmer, through technology and science, is a producer of large amounts of food products. This has, however, not been to the farmer's advantage. When there is a large supply and not as much as demand, the price drops. This has been the case with American farmers, large supplies, low demand, low prices. Low prices result in low incomes. In order to offset this, the government has enacted price supports to raise the price of agricultural products. - Bob A. Rabboh, Ronald J Barton, Principles of Economics निम्नलिखित पाठ को ध्यान से पढ़ें और नीचे दिए गए प्रश्न का उत्तर दें: सरकार यह निर्णय ले सकती है कि संतुलन मूल्य पर्याप्त नहीं है और सामाजिक समस्याओं का कारण बन रहा है। उदाहरण के लिए, अमेरिकी किसान, प्रौद्योगिकी और विज्ञान के माध्यम से, बड़ी मात्रा में खाद्य उत्पादों का उत्पादक है। हालाँकि, यह किसान के लिए फायदेमंद नहीं रहा है। जब आपूर्ति अधिक होती है और मांग उतनी नहीं होती, तो कीमत गिर जाती है। अमेरिकी किसानों के साथ भी यही हुआ है, बड़ी आपूर्ति, कम मांग, कम कीमतें। कम कीमतों के परिणामस्वरूप कम आय होती है। इसे संतुलित करने के लिए, सरकार ने कृषि उत्पादों की कीमत बढ़ाने के लिए मूल्य समर्थन अधिनियमित किया है। - बॉब ए. रब्बो, रोनाल्ड जे बार्टन, अर्थशास्त्र के सिद्धांत What is Maximum price Ceiling? On What type of goods is it normally imposed? Explain its effect.(Use Diagram). अधिकतम मूल्य सीमा क्या है? यह सामान्यतः किस प्रकार के सामान पर लगाया जाता है? इसका प्रभाव बताइये। (आरेख का प्रयोग करें).	4
31	Read the following and answer the questions on the basis of the same: - A consumer is an economic agent who uses goods and services for the direct satisfaction of his / her wants. Consumer consists of institution, individuals and groups of individuals or households. Consumer behaviour refers to the way in which consumers spend their income. The consumer derives utility from his expenditure. The consumer chooses his expenditures and maximums his utility with the given income and given prices of goods and services. Consumption of goods and services leads to satisfaction of human wants. This satisfaction is called "Utility". Utility may be defined as "satisfaction derived from the consumption of a commodity" or it may be defined as "want-satisfying power of a commodity". Total Utility (TU) It is the sum total of utility derived from the consumption of all the units of a commodity. Marginal Utility (MU) It refers to additional utility on account of the consumption of an additional unit of a commodity. a. Define Law of DMU b. State the relationship between TU &MU. or A consumer consumes only two goods X and Y. At a consumption level of these two goods, he finds that the ratio of marginal utility to price in case of X is higher than that in case of Y. Explain the reaction of the consumer.	4

	में उपभोक्ता अपनी आय खर्च करते हैं। उपभोक्ता अपने व्यय से उपयोगिता प्राप्त करता है। उपभोक्ता अपने व्यय का चयन करता है और दी गई आय और वस्तुओं और सेवाओं की दी गई कीमतों के साथ अपनी उपयोगिता को अधिकतम करता है। वस्तुओं और सेवाओं के उपभोग से मानवीय इच्छाओं की संतुष्टि होती है। इस संतुष्टि को "उपयोगिता" कहा जाता है। उपयोगिता को "किसी वस्तु के उपभोग से प्राप्त संतुष्टि" के रूप में परिभाषित किया जा सकता है या इसे "किसी वस्तु की इच्छा-संतुष्टि शक्ति" के रूप में परिभाषित किया जा सकता है। कुल उपयोगिता (टीयू) यह किसी वस्तु की सभी इकाइयों के उपभोग से प्राप्त उपयोगिता का कुल योग है। सीमांत उपयोगिता (एमयू) यह किसी वस्तु की अतिरिक्त इकाई के उपभोग के कारण अतिरिक्त उपयोगिता को संदर्भित करता है। a. डीएमयू का नियम परिभाषित करें b. टीयू और एमयू के बीच संबंध बताएं। या एक उपभोक्ता केवल दो वस्तुओं X और Y का उपभोग करता है। इन दो वस्तुओं के उपभोग स्तर पर, वह पाता है कि X के मामले में सीमांत उपयोगिता और कीमत का अनुपात Y के मामले में उससे अधिक है। उपभोक्ता की प्रतिक्रिया स्पष्ट कीजिए	
32	On the basis of the following diagram, answer the following questions: निम्नलिखित आरेख के आधार पर निम्नलिखित प्रश्नों के उत्तर दीजिए  a) Identify the three short run cost curves and why all are U shaped? b) Why does the distance between curve A and curve B falls with rise in output? c) Why does the minimum point of curve A lie the right of minimum point of curve B? a) तीन अल्पावधि लागत वक्रों की पहचान कीजिए तथा बताइए कि सभी U आकार के क्यों हैं? b) उत्पादन में वृद्धि के साथ वक्र A और वक्र B के बीच की दूरी क्यों घटती है? c) वक्र A का न्यूनतम बिंदु वक्र B के न्यूनतम बिंदु के दाईं ओर क्यों स्थित है?	4
33	a) Define Indifference curve and Budget line. b) Explain the following: a. Why does Indifference convex to the origin? b. Why does a higher indifference curve represent a higher level of satisfaction? or State giving reason, whether the following statements are true or false:	6

	a) If a fall in price of good X leads to a rise in demand for good Y, then X and Y are substitute goods. b) A shift in demand curve of the given commodity may be caused by change in any determinant of demand function c)Demand for a good always increases with increase in income of its buyers a) उदासीनता वक्र और बजट रेखा को परिभाषित करें। b) निम्नलिखित की व्याख्या करें: a. उदासीनता मूल बिंदु पर क्यों उत्तल होती है? b. उच्च उदासीनता वक्र उच्च स्तर की संतुष्टि का प्रतिनिधित्व क्यों करता है? **या** कारण बताते हुए बताएं कि क्या निम्नलिखित कथन सत्य हैं या असत्य: a) यदि वस्तु X की कीमत में गिरावट से वस्तु Y की मांग में वृद्धि होती है, तो X और Y स्थानापन्न वस्तुएँ हैं। b) दी गई वस्तु के मांग वक्र में बदलाव मांग फ़ंक्शन के किसी भी निर्धारक में परिवर्तन के कारण हो सकता है c) किसी वस्तु की मांग हमेशा उसके खरीदारों की आय में वृद्धि के साथ बढ़ती है	
34	Which of the following statements are true or false? Give valid reasons in support of your answer. (i) Average Revenue is always equal to Price. (ii) A rational producer always operates in the first phase of production (iii) Total cost curve and Total variable cost curve are parallel to each other निम्नलिखित में से कौन सा कथन सत्य या असत्य है? अपने उत्तर के समर्थन में वैध कारण दीजिये। (i) औसत राजस्व हमेशा कीमत के बराबर होता है। (ii) एक तर्कसंगत उत्पादक हमेशा उत्पादन के पहले चरण में काम करता है (iii) कुल लागत वक्र और कुल परिवर्तनीय लागत वक्र एक दूसरे के समानांतर हैं	6

MARKING SCHEME- SQP-1

Q.NO	SECTION A- STATISTICS	MARKS
1	(b) Teacher teaching his own child	1
2	(b) Quantitative classification	1
3	(b)It is best used with ordinal data Or c. Median	1
4	c) Sub-divided bar diagram	1
5	(c) Independent	1
6	(d) Statement 2 is True and Statement 1 is False	1
7	a. Lower limit of the median class	1
8	a) Both Assertion (A) and Reason(R) are true and Reason (R) is the correct explanation of Assertion (A).	1
9	c) Assertion (A) is true but Reason(R) is false	1
10	(b) Reference Year	1

11	An index number is a statistical measure designed to show changes in a variable (or a group of variables) over time. It provides a way to quantify the average change in a group of related variables with respect to a base period. Uses of index number It helps in measuring changes in the standard of living as well as the price level. Wage rate regulation is consistent with the changes in the price level. With the determination of price levels, wage rates may be revised. Government policies are framed following the index number of prices.	1+2
12	Questions should be small & clear. Questions should be arranged logically. Instructions should be clear. Questions should be relevant to the investigation. Personal questions should be avoided. Avoid questions of calculations. Or Census 'Method Census method is that method in which data are collected covering every item of the universe or population relating to the problem under investigation. • Reliable and accurate • Less biased • Extensive information • Study of diverse characteristic • Study of complex investigation • Indirect investigation	3
13	Formula (any method) Calculation AM=412	4
14	a) It is a geometric technique of presenting statistical data through bar diagrams and pie diagrams. b) (a) The monthly rainfall in a year can be best represented by a bar diagram as only one variable i.e., monthly rainfall is to be presented diagrammatically. The rainfall is plotted on Y-axis in the corresponding month that is plotted on the X-axis. (b) Composition of the population of Delhi by religion can be represented by a Subdivided bar diagram. A component bar diagram shows the bar and its sub-divisions into two or more components. Thus, the total population can be sub divided in terms of religion and presented through a component bar diagram. (c) Different components of cost in a factory can most effectively be depicted through a pie chart. The circle represents the total cost and various components of costs are shown by different portions of the circle drawn according to percentage of total cost each component covers.	1+3
15	Draw Histogram. Mode=25 Or Draw Histogram and frequency curve	4

16	Median is the middle value of the series when arranged in order of the magnitude. Mode is the value which occurs most frequently in the series, that modal value has the highest frequency in the series. b) formula calculation L1=20 N/2=40 CF=18 F=22 C=20 (20+40-18/22*20) Median=40	2+4
17	 Formula Calculation rk=0.903 Or Formula Calculation r=0.8 The coefficient of correlation for the given data is approximately 0.832 This indicates a strong positive linear relationship between X and Y.	6
	SECTIONB-MICRO ECONOMICS	
18	b) ₹60,000 or a) What to produce	1
19	d) All of these	1
20	c) C –iii	1
21	(c) MUx/Px = MUy/Py = Mum	1
22	(a) Statement 1 is true and statement 2 is false.	1
23	(c) Positively sloped straight line passing from the origin	1
24	c) 8%	1
25	TFC	1
26	a) Statement 1 is true and statement 2 is false	1
27	d) 33 units	1
28	Large number of buyers and sellers Homogenous product Perfect knowledge Or Equilibrium refers to the situation in which market demand is equal to market supply. The given diagram shows a situation of an increase in demand. The demand curve shifts to the right, from DD to D1D1. Equilibrium point shifts from E to E1. Consequently, the equilibrium price rises from OP to OP1, and equilibrium quantity increases from OQ to OQ1.	3
29	The introduction of free and universal healthcare services under AB-HWCs and health coverage under AB-PMJAY is likely to positively impact India's Production Possibility Curve by enhancing productivity, improving health outcomes, reducing healthcare costs, and potentially leading to overall economic growth and development. This shift is illustrated by an outward movement of the PPC, indicating increased production possibilities across various sectors of the economy	3

30	Maximum price ceiling is the legislated or government-imposed maximum level of price that can be charged by the seller. Usually, the government fixes this maximum price much below the equilibrium price, in order to preserve the welfare of the poorer and vulnerable section of the society. (diagram) Maximum Price Ceiling is normally imposed by the government on goods needed by masses, like wheat, rice, sugar etc	4
31	a) The law of diminishing marginal utility states that the marginal utility derived from the consumption of a commodity must decline as more and more units of that commodity are consumed at a point in time b) When MU decreases, TU increases at a diminishing rate. When MU is zero, TU is constant and maximum. When MU is negative, TU starts diminishing. Or In this case, the consumer is getting more marginal utility per rupee in case of good X as compared to Y. Therefore, he will buy more of X and less of Y. this will lead of fall in M U_X and rise in M U_Y. The consumer will continue to buy more of X till M U X P X = M U Y P Y.r	1+3
32	a) A-AC B-AVC C-AFC Law of variable proportion b) AFC decreases with increasing output c)AC=AFC+AVC	4
33	a)An indifference curve is a curve that represents all the combinations of goods that give the same satisfaction to the consumer Budget line is a graphical representation which shows all the possible combinations of the two goods that a consumer can buy with the given income and prices of commodities. b) i)IC is strictly Convex to origin i.e. MRSxy is always diminishing **Reason:** Due to the law of diminishing marginal utility a consumer is always willing to sacrifice lesser units of a commodity for every additional unit of another good. ii)Higher indifference curve represents larger bundles of goods i.e. bundles which contain more of both or more of at least one. It is assumed that consumer's preferences are monotonic i.e. he always prefers larger bundle as it gives him higher satisfaction or a) False: X& Y are complementary good. in case of substitute good fall in price of one good reduces the demand for another good. b) False. It cannot be caused by change in price of the given commodity. Change in all determinants lead to shift in demand curve. (c) False: with increase in income, the demand for normal and superior good increase, but the demand for inferior good decreases.	6

34	i) True: Average Revenue is always equal to Price. (ii) False: A rational producer does not always operate in the first phase of production; they operate where MR = MC to maximize profit. (iii) False: Total cost curve (TC) and Total variable cost curve (TVC) are not parallel; TC includes TFC, so it is above TVC by the amount of TFC	6

SAMPLE QUESTION PAPER-2

General Instructions

सामान्य निर्देश

This question paper contains two parts:

इस प्रश्न पत्र में दो भाग हैं:

Part A – STATISTICS FOR ECONOMICS (40 marks)

भाग ए - अर्थशास्त्र के लिए सांख्यिकी (40 अंक)

Part B - INTRODUCTORY MICRO ECONOMICS (40 marks).

भाग बी - परिचयात्मक सूक्ष्म अर्थशास्त्र (40 अंक)

Marks for questions are indicated against each question.

प्रत्येक प्रश्न के सामने प्रश्नों के अंक अंकित हैं।

This paper contains 20 Multiple Choice Questions of 1 mark each

इस पेपर में 1 अंक के 20 बहुविकल्पीय प्रश्न हैं

This paper contains 4 Short Answer type questions of 3 marks each to be answered in 60 to 80 words.

इस पेपर में 3 अंकों के 4 लघु उत्तरीय प्रश्न हैं जिनका उत्तर 60 से 80 शब्दों में देना है।

This paper contains 6 Short Answer type questions of 4 marks each to be answered in 80 to 100 words.

इस पेपर में 4 अंकों के 6 लघु उत्तरीय प्रश्न हैं जिनका उत्तर 80 से 100 शब्दों में देना है।

This paper contains 4 Long Answer type questions of 6 marks each to be answered in 100 to 150 words

इस पेपर में 6 अंकों के 4 दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 100 से 150 शब्दों में देना होगा

Q.NO प्र.सं	**Part A- Statistics for Economics** **भाग ए- अर्थशास्त्र के लिए सांख्यिकी**	**Marks** अंक
1	Statistics in plural sense deals with: (a) Numerical information (b) Methods of collection of data (c) methods of presentation of data (d) Both (a) and (b) Or Which of the following is an example of qualitative data? (a)Aptitude in music (b) Height (c) weight (d) All of these सांख्यिकी बहुवचन अर्थ में निम्नलिखित से संबंधित है: (a) संख्यात्मक जानकारी (b) डेटा संग्रह के तरीके (c) डेटा की प्रस्तुति के तरीके (d) (a) और (b) दोनों	**1**

<table>
<tr><td></td><td>या
निम्नलिखित में से कौन गुणात्मक डेटा का उदाहरण है
(a) संगीत में योग्यता (b) ऊंचाई (c) वजन (d) ये सभी</td><td></td></tr>
<tr><td>2</td><td>Data collected by a student from Government journals to prepare a project report is
(a) Primary data (b) secondary data (c) census data (d) none of the above
एक छात्र द्वारा परियोजना रिपोर्ट तैयार करने के लिए सरकारी पत्रिकाओं से एकत्रित डेटा है
(a) प्राथमिक डेटा (b) द्वितीयक डेटा (c) जनगणना डेटा (d) उपरोक्त में से कोई नहीं</td><td>1</td></tr>
<tr><td>3</td><td>Given the following table, the nature of classification is---------
<table><tr><td>Days</td><td>Sale of Ice Cream(units)</td></tr><tr><td>Monday
Tuesday
Wednesday
Thursday</td><td>1000
1500
2700
3700</td></tr></table>(a) qualitative (b) quantitative (c) chronological (d) geographical
. निम्न तालिका में वर्गीकरण की प्रकृति इस प्रकार है ---------
<table><tr><td>दिन</td><td>आइसक्रीम की बिक्री (इकाइयाँ)</td></tr><tr><td>सोमवार
मंगलवार
बुधवार
गुरुवार</td><td>1000
1500
2700
3700</td></tr></table>(a) गुणात्मक (b) मात्रात्मक (c) कालानुक्रमिक (d) भौगोलिक</td><td>1</td></tr>
<tr><td>4</td><td>Choose the Incorrect pair
<table><tr><td>Column 1</td><td>Column 2</td></tr><tr><td>A. Scarcity</td><td>i. Economic problem</td></tr><tr><td>B. Analysis of data</td><td>ii. Averages</td></tr><tr><td>C. Distribution</td><td>ii. Non-economic activity</td></tr><tr><td>D. Statistics</td><td>iii. Quantitative expression</td></tr></table>(a) A- i (b) B-ii (c) C- iii (d) D-iv
गलत जोड़ी चुनें
<table><tr><td>A. कमी</td><td>i. आर्थिक समस्या</td></tr><tr><td>B. डेटा का विश्लेषण</td><td>ii. औसत</td></tr><tr><td>C. वितरण</td><td>iv. गैर-आर्थिक गतिविधि</td></tr><tr><td>D. सांख्यिकी</td><td>v. मात्रात्मक अभिव्यक्ति</td></tr></table>(a) A- i (b) B-ii (c) C- iii (d) D-iv</td><td>1</td></tr>
</table>

5	**Read the following statements carefully and choose the correct alternative from the following:** **Statement 1**: Histogram is a two-dimensional diagram **Statement 2**: Histogram gives value of the mode of frequency distribution graphically a) Both the statements are true. b) Both the statements are false. c) Statement 1 is true and Statement 2 is false d) Statement 1 is false and Statement 2 is true कथन 1: हिस्टोग्राम एक द्वि-आयामी आरेख है कथन 2: हिस्टोग्राम ग्राफिक रूप से आवृत्ति वितरण के मोड का मान देता है a) दोनों कथन सत्य हैं। b) दोनों कथन असत्य हैं। c) कथन 1 सत्य है और कथन 2 असत्य है d) कथन 1 असत्य है और कथन 2 सत्य है	**1**
6	**Read the following statements carefully and choose the correct alternative from the following:** **Statement1: Cost** of living index measures the average change in retail prices **Statement 2**: Since the number of commodities is large, it is necessary to identify a particular group of consumers and select commodities which are generally consumed by them a) Both the statements are true. b) Both the statements are false. c) Statement 1 is true and Statement 2 is false d) Statement 1 is false and Statement 2 is true निम्नलिखित कथनों को ध्यानपूर्वक पढ़ें और निम्नलिखित में से सही विकल्प चुनें: कथन 1: जीवन-यापन लागत सूचकांक खुदरा कीमतों में औसत परिवर्तन को मापता है कथन 2: चूँकि वस्तुओं की संख्या बड़ी है, इसलिए उपभोक्ताओं के एक विशेष समूह की पहचान करना और उन वस्तुओं का चयन करना आवश्यक है जिनका आमतौर पर उनके द्वारा उपभोग किया जाता है a) दोनों कथन सत्य हैं। b) दोनों कथन असत्य हैं। c) कथन 1 सत्य है और कथन 2 असत्य है d) कथन 1 असत्य है और कथन 2 सत्य है	**1**
7	The value which has the highest frequency in a series is called (a) Quartile (b) Mean (c) Median (d) Mode किसी श्रेणी में जिस मान की आवृत्ति सबसे अधिक होती है उसे कहते हैं (a) चतुर्थक (b) माध्य (c) माध्यिका (d) बहुलक	**1**
8	Index number for the base year period is---------- (a) 1 (b) 0 (c) 100 (d) None of these आधार वर्ष अवधि के लिए सूचकांक संख्या ---------- है (a) 1 (b) 0 (c) 100 (d) इनमें से कोई नहीं	**1**
9	Identify the degree of correlation of the given diagram	**1**

	 (a). Positive and linear b. Negative and linear C. Moderate positive d. Moderate negative correlation दिए गए आरेख के सहसंबंध की डिग्री की पहचान करें  (a). सकारात्मक और रैखिक b. नकारात्मक और रैखिक C. मध्यम सकारात्मक d. मध्यम नकारात्मक सहसंबंध	
10	Read the following statements- Assertion (A) and Reason (R).- Choose the correct alternative given below **Assertion (A)**: Average is a value in a series which is typical of representative of a set of data i.e, it is a single value which represents an entire set of data **Reason (R):** A measure of central tendency is a value which reads the characteristics of the complex and diversified set of given data. It is the value to which most of the observations in the series fall closer than to any other value of the series Alternatives a) Both Assertion A and reason R are true and Reason R is the correct explanation of Assertion A b) Both Assertion A and reason R are true and Reason R is not the correct explanation of Assertion A c) Assertion A is true but Reason R is false d) Assertion A is false but Reason R is true . निम्नलिखित कथनों को पढ़ें- अभिकथन (A) और कारण (R).- नीचे दिए गए सही विकल्प का चयन करें अभिकथन (A): औसत एक श्रृंखला में एक मान है जो डेटा के एक सेट का प्रतिनिधि है, यानी, यह एक एकल मान है जो डेटा के पूरे सेट का प्रतिनिधित्व करता है	**1**

	कारण (R): केंद्रीय प्रवृत्ति का माप एक ऐसा मान है जो दिए गए डेटा के जटिल और विविधतापूर्ण सेट की विशेषताओं को पढ़ता है। यह वह मान है जिसके करीब श्रृंखला में अधिकांश अवलोकन श्रृंखला के किसी भी अन्य मान की तुलना में आते हैं विकल्प a) कथन A और कारण R दोनों सत्य हैं तथा कारण R, कथन A की सही व्याख्या है b) कथन A और कारण R दोनों सत्य हैं तथा कारण R, कथन A की सही व्याख्या नहीं है c) कथन A सत्य है, लेकिन कारण R असत्य है d) कथन A असत्य है, लेकिन कारण R सत्य है	
11	Calculate consumer price index number from the following data by taking 2014 as base year Item | Price in 2014(Rs) | Price in 2019(Rs) | Weight (%) Food | 200 | 280 | 30 Rent | 100 | 200 | 20 Clothing | 150 | 120 | 20 Fuel and Lighting | 50 | 100 | 10 Miscellaneous | 100 | 200 | 20 **OR** Define Index numbers. Explain the uses of Index numbers . 2014 को आधार वर्ष मानकर निम्नलिखित आंकड़ों से उपभोक्ता मूल्य सूचकांक संख्या की गणना करें | 2014 में वस्तु की कीमत (रु.) | 2014 में वस्तु की कीमत (रु.) | वजन (%) खाना | 200 | 280 | 30 किराया | 100 | 200 | 20 कपड़े | 150 | 120 | 20 ईंधन और प्रकाश | 50 | 100 | 10 विविध | 100 | 200 | 20 **या** सूचकांक संख्याओं को परिभाषित करें। सूचकांक संख्याओं के उपयोग बताइये।	**3** **1+2**
12	The ranks assigned by two Judges to five students in essay writing competition is given below. Calulate coefficient of rank correlation Ranks by Judge I | 1 | 2 | 3 | 4 | 5 Ranks by Judge II | 4 | 2 | 1 | 3 | 5 निबंध लेखन प्रतियोगिता में दो जजों द्वारा पांच छात्रों को दिए गए कार्य नीचे दिए गए हैं। रैंक सहसंबंध गुणांक की गणना करें	**3**

	न्यायाधीश I द्वारा रैंक	1	2	3	4	5
	न्यायाधीश II द्वारा रैंक	4	2	1	3	5

13 Read the following news article and answer the following questions on the basis of same

An outgoing member of India's Monetary Policy Committee raised concerns over the inflation data released by the government statistical office for the months when the country was under a lockdown.The data according to Ravindra Dholakia, was contray to other indicators which suggest a fall in inflation rather than the raise suggested by the data released by the statistical office

This concern relates to the weight given to different comodities in the inflation index .Inflation in India is based on a "fixed base –weighted index" rather than the "chain-base weighted index" method followed in the developed countries, Dholakia said . In simple terms, the weight of individual items is fixed based on consumption in the base year rather than in the current year.

" In an extreme situation created by the nationwide lockdown for months , the consumption pattern in the country has significantly and substantially changed" , Dholakia said. "This would simply not be reflected in the measurement of our headline inflation based on the fixed base-weighted index even if all price quotations were available,and would provide an unrealistic measurement of inflation".

a) What is meant by 'Weight' in Index numbers **1**
b) Write any two uses of Wholesale price index **2**
c) Which Index number is widely used to measure the rate of inflation **1**

निम्नलिखित समाचार लेख को पढ़ें और उसी के आधार पर निम्नलिखित प्रश्नों के उत्तर दें।

भारत की मौद्रिक नीति समिति के एक निवर्तमान सदस्य ने सरकारी सांख्यिकी कार्यालय द्वारा उन महीनों के लिए जारी मुद्रास्फीति के आंकड़ों पर चिंता जताई, जब देश लॉकडाउन में था। रवींद्र ढोलकिया के अनुसार, डेटा अन्य संकेतकों के विपरीत था, जो सांख्यिकी कार्यालय द्वारा जारी किए गए डेटा द्वारा सुझाए गए वृद्धि के बजाय मुद्रास्फीति में गिरावट का संकेत देते हैं।

यह चिंता मुद्रास्फीति सूचकांक में विभिन्न वस्तुओं को दिए गए भार से संबंधित है। ढोलकिया ने कहा कि भारत में मुद्रास्फीति विकसित देशों में अपनाई जाने वाली "चेन-बेस वेटेड इंडेक्स" पद्धति के बजाय "निश्चित आधार-भारित सूचकांक" पर आधारित है। सरल शब्दों में, अलग-अलग वस्तुओं का भार चालू वर्ष के बजाय आधार वर्ष में खपत के आधार पर तय किया जाता है।

ढोलकिया ने कहा, "देश भर में कई महीनों तक लॉकडाउन के कारण पैदा हुई चरम स्थिति में, देश में खपत का पैटर्न काफी हद तक बदल गया है।" "यह निश्चित

	आधार-भारित सूचकांक के आधार पर हमारे हेडलाइन मुद्रास्फीति के मापन में परिलक्षित नहीं होगा, भले ही सभी मूल्य उद्धरण उपलब्ध हों, और यह मुद्रास्फीति का एक अवास्तविक माप प्रदान करेगा"। a) सूचकांक संख्याओं में 'भार' का क्या अर्थ है? b) थोक मूल्य सूचकांक के कोई दो उपयोग लिखें c) मुद्रास्फीति की दर को मापने के लिए किस सूचकांक संख्या का व्यापक रूप से उपयोग किया जाता है	
14	Calculate Mode from the following data Wages: 0-5 | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 No.of workers: 4 | 6 | 10 | 10 | 25 | 24 | 20 | 1 निम्नलिखित डेटा से बहुलक की गणना करें मजदूरी: 0-5 | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 श्रमिकों की संख्या: 4 | 6 | 10 | 10 | 25 | 24 | 20 | 1	
15	Define the term sampling errors. How can we reduce the magnitude of sampling errors?. Also explain different types of Non-sampling errors Or Distinguish between Census Survey and Sample Survey. Why sample surveys are prefered in statistics नमूनाकरण त्रुटि शब्द को परिभाषित करें। हम नमूनाकरण त्रुटियों की मात्रा को कैसे कम कर सकते हैं? विभिन्न प्रकार की गैर-नमूनाकरण त्रुटियों की भी व्याख्या करें या जनगणना सर्वेक्षण और नमूना सर्वेक्षण के बीच अंतर करें। सांख्यिकी में नमूना सर्वेक्षण को क्यों प्राथमिकता दी जाती है	**1+1+2** **2+2**
16	a) State any two properties of Correlation Coefficient b) Find out Karl Pearson's coefficient of correlation using the data given below Marks in Economics(X): 4 | 6 | 8 | 10 | 12 Marks in English (Y): 6 | 8 | 10 | 12 | 14 a) सहसंबंध गुणांक के कोई दो गुण बताएँ b) नीचे दिए गए डेटा का उपयोग करके कार्ल पियर्सन के सहसंबंध गुणांक का पता लगाएँ अर्थशास्त्र में अंक (X): 4 | 6 | 8 | 10 | 12	**2** **4**

		अंग्रेजी में अंक (Y)	6	8	10	12	14	

17

a) Define a variable. Distinguish between discrete variable and continuous variable **2**

b) Calculate Median using 'less than ogive and more than ogive using the data given below **4**

Marks	5-15	15-25	25-35	35-45	45-55	55-65
No of students	4	6	10	5	3	2

OR

a) Explain any two merits and demerits of tabular presentation of data **2+4**

b) Construct Histogram for the following distribution

Weekly wages	No.of workers
10-15	4
15-20	16
20-25	24
25-30	32
30-40	40
40-60	48

a) एक चर को परिभाषित करें। असतत चर और सतत चर के बीच अंतर करें। b) नीचे दिए गए डेटा का उपयोग करके 'ओजाइव से कम और ओजाइव से अधिक' का उपयोग करके माध्यिका की गणना करें

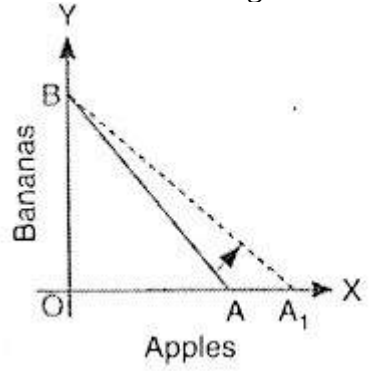
अंक	5-15	15-25	25-35	35-45	45-55	55-65
छात्रों की संख्या	4	6	10	5	3	2

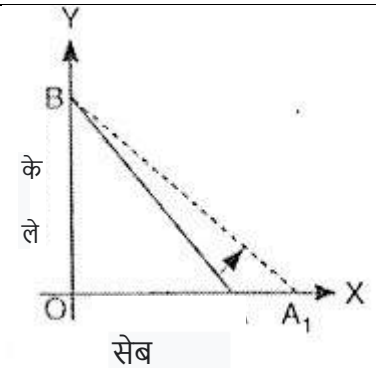
अथवा

a) आंकड़ों के सारणीबद्ध प्रस्तुतीकरण के कोई दो गुण और दोष बताइए

b) निम्नलिखित वितरण के लिए हिस्टोग्राम का निर्माण कीजिए

साप्ताहिक वेतन	श्रमिकों की संख्या
10-15	4
15-20	16
20-25	24

		25-30	32		
		30-40	40		
		40-60	48		
	Part B- Introductory Microeconomics **भाग बी- परिचयात्मक सूक्ष्मअर्थशास्त्र**				
18	Which of the following is an example of a Positive Economics a. India Should take steps to control rising prices b. There are inequalities of income in our country c. India should not be an overpopulated country d. Income inequalities should be reduced Or The problem of 'What to produce' relates to: a. The choice of technique b. Distribution of income c. Market value of the goods and services d. The choice of goods and services निम्नलिखित में से कौन सा सकारात्मक अर्थशास्त्र का उदाहरण है a. भारत को बढ़ती कीमतों को नियंत्रित करने के लिए कदम उठाने चाहिए b. हमारे देश में आय की असमानताएँ हैं c. भारत को अधिक आबादी वाला देश नहीं बनना चाहिए d. आय असमानताओं को कम किया जाना चाहिए **या** 'क्या उत्पादन करें' की समस्या निम्न से संबंधित है: a. तकनीक का चुनाव b. आय का वितरण c. वस्तुओं और सेवाओं का बाजार मूल्य d. वस्तुओं और सेवाओं का चुनाव				**1**
19	The rotation of budgetline in the following diagram is due to  a.Decrease in the price of apple b. Increase in the price of apple c. Increase in the price of banana d. Decrease in the price of banana निम्नलिखित आरेख में बजट रेखा का घूर्णन किसके कारण है?				**1**



. a.सेब की कीमत में कमी b.सेब की कीमत में वृद्धि
c.केले की कीमत में वृद्धि d.केले की कीमत में कमी

20 The factor which causes movement along the demand curve is **1**

a. Price of the commodity b. price of other goods
c. Income of the consumer d. tastes of consumer

मांग वक्र के साथ गति का कारण बनने वाला कारक है

a. वस्तु की कीमत b. अन्य वस्तुओं की कीमत

c. उपभोक्ता की आय d. उपभोक्ता की पसंद

21 Identify the **incorrect** pair of statement from the set of statements given in column I and column II below **1**

Column I	Column II
(A).AFC curve is a rectangular hyperbola curve	i.AFC falls as output increases
(B) AVC curve is a Ushaped curve	ii. Application of law of variable proportion
(C) Marginal Cost	iii. Sum of Total Variable Cost
(D) Explicit cost	iv. Salary paid to the employees

a. A-i b. B-ii c. C-iii d. D-iv

नीचे कॉलम I और कॉलम II में दिए गए कथनों के समूह में से गलत कथन युग्म की पहचान करें

कॉलम I	कॉलम II
A). AFC वक्र एक आयताकार हाइपरबोला वक्र है	i.उत्पादन बढ़ने पर AFC गिरता है
(B) AVC वक्र एक Uआकार का वक्र है	ii. परिवर्तनशील अनुपात के नियम का अनुप्रयोग
(C) सीमांत लागत	iii. कुल परिवर्तनशील लागत का योग

	(D) स्पष्ट लागत | iv. कर्मचारियों को दिया जाने वाला वेतन a. A-i b. B-ii c. C-iii d. D-iv	
22	**Read the following statements carefully and choose the correct alternative from the following:** Statement 1:Average revenue is the per unit revenue received from the sale of the commodity Statement 2: When AR is constant , MR < AR a) Both the statements are true. b) Both the statements are false. c) Statement 1 is true and Statement 2 is false d) Statement 1 is false and Statement 2 is true निम्नलिखित कथनों को ध्यानपूर्वक पढ़ें और निम्नलिखित में से सही विकल्प चुनें: कथन 1: औसत राजस्व वस्तु की बिक्री से प्राप्त प्रति इकाई राजस्व है कथन 2: जब AR स्थिर होता है, तो MR < AR a) दोनों कथन सत्य हैं। b) दोनों कथन असत्य हैं। c) कथन 1 सत्य है और कथन 2 असत्य है d) कथन 1 असत्य है और कथन 2 सत्य है	**1**
23	Which of the following will cause a leftward shift of firm's supply curve? a. Technological progress b. Fall in input price c. Subsidy on production d. Rise in price of other goods निम्नलिखित में से कौन फर्म के आपूर्ति वक्र के बायीं ओर बदलाव का कारण बनेगा? a. तकनीकी प्रगति b. इनपुट मूल्य में गिरावट c. उत्पादन पर सब्सिडी d. अन्य वस्तुओं की कीमत में वृद्धि	**1**
24	If Average Product of one unit of a variable factor is 12 units and that of 2 units of the variable factor is 16 units, then marginal product of 2nd unit of variable factor is ---------- a.28 units b. 20 units c. 4 units d.44 units यदि किसी परिवर्तनशील कारक की एक इकाई का औसत उत्पाद 12 इकाइयाँ है और परिवर्तनशील कारक की 2 इकाइयों का औसत उत्पाद 16 इकाइयाँ है, तो परिवर्तनशील कारक की दूसरी इकाई का सीमांत उत्पाद ---------- है a.28 इकाइयाँ b. 20 इकाइयाँ c. 4 इकाइयाँ d.44 इकाइयाँ	**1**
25	The price which is fixed at a level lower than the equilibrium price is----- a. Price ceiling b. price floor c. fixed price d.all of these वह कीमत जो संतुलन कीमत से कम स्तर पर तय की जाती है, वह है- a. मूल्य सीमा b. मूल्य तल c. निश्चित मूल्य d. ये सभी	**1**
26	Read the following statements- Assertion (A) and Reason (R .- Choose one correct alternative given below	**1**

	Assertion(A). Increase in income of the consumers causes increase in equilibrium price and equilibrium quantity of normal goods **Reason (R)** Rise in income causes demand of a normal good by consumers to go up. Due to excess demand, there is competition among buyers which pushes the price upwards **Alternatives** a. Both Assertion A and reason R are true and Reason R is the correct explanation of Assertion A b. Both Assertion A and reason R are true and Reason R is not the correct explanation of Assertion A c. Assertion A is true but Reason R is false d. Assertion A is false but Reason R is true निम्नलिखित कथनों को पढ़ें- अभिकथन (A) और कारण (R.- नीचे दिए गए एक सही विकल्प को चुनें अभिकथन (A). उपभोक्ताओं की आय में वृद्धि से सामान्य वस्तुओं की संतुलन कीमत और संतुलन मात्रा में वृद्धि होती है कारण (R) आय में वृद्धि से उपभोक्ताओं द्वारा सामान्य वस्तु की मांग बढ़ जाती है। अधिक मांग के कारण, खरीदारों के बीच प्रतिस्पर्धा होती है जो कीमत को ऊपर की ओर धकेलती है विकल्प a. अभिकथन A और कारण R दोनों सत्य हैं और कारण R, अभिकथन A की सही व्याख्या है b. अभिकथन A और कारण R दोनों सत्य हैं और कारण R, अभिकथन A की सही व्याख्या नहीं है c. अभिकथन A सत्य है लेकिन कारण R असत्य है d. अभिकथन A असत्य है लेकिन कारण R सत्य है	
27	Read the following statements- Assertion (A) and Reason (R .- Choose one correct alternative given below Assertion(A). Total cost curve and total variable cost curves are parallel to each other Reason (R). The vertical distance between TC and TVC curve is TFC, which increases with increase in output Alternatives a..Both Assertion A and reason R are true and Reason R is the correct explanation of Assertion A b. Both Assertion A and reason R are true and Reason R is not the correct explanation of Assertion A c. Assertion A is true but Reason R is false d. Assertion A is false but Reason R is true निम्नलिखित कथनों को पढ़ें- अभिकथन (A) और कारण (R.- नीचे दिए गए एक सही विकल्प का चयन करें अभिकथन (A)। कुल लागत वक्र और कुल परिवर्तनीय लागत वक्र एक दूसरे के समानांतर हैं	**1**

	कारण (R)। TC और TVC वक्र के बीच ऊर्ध्वाधर दूरी TFC है, जो उत्पादन में वृद्धि के साथ बढ़ती है **विकल्प** a.. अभिकथन A और कारण R दोनों सत्य हैं और कारण R, अभिकथन A की सही व्याख्या है b. अभिकथन A और कारण R दोनों सत्य हैं और कारण R, अभिकथन A की सही व्याख्या नहीं है c. अभिकथन A सत्य है लेकिन कारण R असत्य है d. अभिकथन A असत्य है लेकिन कारण R सत्य है	
28	Name the technical term used to denote the rate at which the quantity of output of one commodity is sacrificed to produce one more unit of the other good. Explain it with the help of an example उस तकनीकी शब्द का नाम बताइए जिसका उपयोग उस दर को दर्शाने के लिए किया जाता है जिस पर एक वस्तु के उत्पादन की मात्रा का त्याग करके दूसरी वस्तु की एक और इकाई का उत्पादन किया जाता है। इसे एक उदाहरण की मदद से समझाइए	**1+2**
29	The price of a commodity rose by 20% as a result of which its demand declined from 20 units to 15 units. Calculate its price elasticity of demand **Or** 20 units of a good are demanded at a price of Rs 5 per unit. Price elasticity of demand is (-1).What will be the price if the quantity demanded falls to 25 units? Use expenditure approach to answer this question किसी वस्तु की कीमत में 20% की वृद्धि हुई जिसके परिणामस्वरूप इसकी मांग 20 इकाइयों से घटकर 15 इकाई रह गई। इसकी मांग की कीमत लोच की गणना करें या किसी वस्तु की 20 इकाइयों की मांग 5 रुपये प्रति इकाई की कीमत पर की जाती है। मांग की कीमत लोच (-1) है। यदि मांग की गई मात्रा 25 इकाइयों तक गिर जाती है तो कीमत क्या होगी? इस प्रश्न का उत्तर देने के लिए व्यय दृष्टिकोण का उपयोग करें	**3**
30	a. State giving reasons whether the following statements are True or False i. If goods X and Y are substitutes, a rise in price of X will result in a rightward shift in demand curve of Y ii. At the point of saturation marginal utility is maximum b. Distinguish between 'extension of demand, and 'increase in demand' क. कारण सहित बताएँ कि निम्नलिखित कथन सत्य हैं या असत्य i. यदि वस्तुएँ X और Y स्थानापन्न हैं, तो X की कीमत में वृद्धि के परिणामस्वरूप Y की माँग वक्र में दाईं ओर बदलाव आएगा ii. संतृप्ति बिंदु पर सीमांत उपयोगिता अधिकतम होती है ख. 'माँग के विस्तार और 'माँग में वृद्धि' के बीच अंतर बताएँ	**2** **2**
31	Read the following news article and answer the following questions on the basis of same	

	Breaking a 30-month long bearish trend ,the price of various pulses in the domestic market has started to rise in the last three months, bringing much – needed relief to the country's beleaguered growers The burdensome inventory of domestic and imported pulses has eased considerably following welcome policy interventions on the demand and supply sides,including free ration of chana to vulnerable families amid covid -19 lockdown and highly restrictive import of other pulses This has brought the supply-demand fundamentals to a state of near equilibrium. The market prices of of most pulses (including chana/gram and tur/arhar, which together account for roughly 65 percent of total production, have moved above the specified minimum support price reflecting a return to balanced market conditions Source- thehindubusinessline.com a. 'Market for agricuitural goods are close examples of a perfectly competitive market'. State one feature of perfect competition b. If equilibrium price of a good is greater than its market price ,explain all changes that will take place in the market c. Explain the term 'price floor' निम्नलिखित समाचार आलेख को पढ़ें और उसी के आधार पर निम्नलिखित प्रश्नों के उत्तर दें 30 महीने से चली आ रही मंदी की प्रवृत्ति को तोड़ते हुए, घरेलू बाजार में विभिन्न दालों की कीमतों में पिछले तीन महीनों में बढ़ोतरी शुरू हो गई है, जिससे देश के संकटग्रस्त उत्पादकों को बहुत जरूरी राहत मिली है। कोविड-19 लॉकडाउन के दौरान कमज़ोर परिवारों को चना का मुफ़्त राशन और अन्य दालों के अत्यधिक प्रतिबंधात्मक आयात सहित मांग और आपूर्ति पक्षों पर स्वागत योग्य नीतिगत हस्तक्षेपों के बाद घरेलू और आयातित दालों का भारी स्टॉक काफ़ी हद तक कम हो गया है। इससे आपूर्ति-मांग के बुनियादी तत्व लगभग संतुलन की स्थिति में आ गए हैं। अधिकांश दालों (चना/ग्राम और तुअर/अरहर सहित, जो कुल उत्पादन का लगभग 65 प्रतिशत हिस्सा हैं) के बाज़ार मूल्य निर्दिष्ट न्यूनतम समर्थन मूल्य से ऊपर चले गए हैं, जो संतुलित बाज़ार स्थितियों की वापसी को दर्शाता है। स्रोत- thehindubusinessline.com क. 'कृषि वस्तुओं का बाजार पूर्णतः प्रतिस्पर्धी बाजार के करीबी उदाहरण हैं।' पूर्ण प्रतिस्पर्धा की एक विशेषता बताइए ख. यदि किसी वस्तु का संतुलन मूल्य उसके बाजार मूल्य से अधिक है, तो बाजार में होने वाले सभी परिवर्तनों की व्याख्या कीजिए ग. 'मूल्य तल' शब्द की व्याख्या कीजिए	**1+2+1**
32	From the following schedule ,find out the level of output at which the producer is in equilibrium. Give reasons for your answer. Output (units) | Price (Rs) | Total Cost (Rs) 1 | 24 | 26 2 | 24 | 50	**4**

3	24	72	
4	24	92	
5	24	115	
6	24	139	
7	24	165	

OR

a. State the relation between Average Revenue and Marginal Revenue
b. Explain any two factors affecting supply of a commodity other than price . **2+2**

आउटपुट(इकाइयाँ)	कीमत (पयेुर)	कुल लागत (पयेुर)
1	24	26
2	24	50
3	24	72
4	24	92
5	24	115
6	24	139
7	24	165

अथवा

क. औसत राजस्व और सीमांत राजस्व के बीच संबंध बताएं
ख. कीमत के अलावा किसी वस्तु की आपूर्ति को प्रभावित करने वाले किन्हीं दो कारकों की व्याख्या करें।

33

a. Explain any two properties of indifference curve
b. A consumer consumes only two goods X and Y both priced at Rs 3 per unit . If the consumer chooses a combination of these two goods with Marginal Rate of Substitution equal to 3, is the consumer in equilibrium ? Give reasons. What will a rational consumer do in this situation? Explain **3+3**

a. उदासीनता वक्र के किसी भी दो गुणों की व्याख्या करें
b. एक उपभोक्ता केवल दो वस्तुओं X और Y का उपभोग करता है, दोनों की कीमत 3 रुपये प्रति इकाई है। यदि उपभोक्ता इन दो वस्तुओं का संयोजन चुनता है, जिसकी सीमांत प्रतिस्थापन दर 3 के बराबर है, तो क्या उपभोक्ता संतुलन में है? कारण बताएँ। इस स्थिति में एक तर्कसंगत उपभोक्ता क्या करेगा? व्याख्या करें

34

Explain the likely behaviour of Total Product and Marginal Product when only one input is increased while all other inputs are kept unchanged. Use diagram **6**

Or

a. Differentiate between Total Fixed Cost and Total Variable Cost. Use Diagram
b. Define marginal cost. Explain why Marginal cost curve is 'U' shaped curve **3+3**

	कुल उत्पाद और सीमांत उत्पाद के संभावित व्यवहार की व्याख्या करें जब केवल एक इनपुट बढ़ाया जाता है जबकि अन्य सभी इनपुट अपरिवर्तित रहते हैं। आरेख का उपयोग करें या a. कुल स्थिर लागत और कुल परिवर्तनीय लागत के बीच अंतर करें। आरेख का उपयोग करें b. सीमांत लागत को परिभाषित करें। समझाएँ कि सीमांत लागत वक्र 'U' आकार का वक्र क्यों है	

MARKING SCHEME- SQP-2

<table>
<tr><th>Q.NO</th><th>ANSWERS</th></tr>
<tr><td>1</td><td>a. Numerical information
Or
a. Aptitude in music</td></tr>
<tr><td>2</td><td>b. Secondary data</td></tr>
<tr><td>3</td><td>c. Chronological</td></tr>
<tr><td>4</td><td>c. C-iii</td></tr>
<tr><td>5</td><td>a) Both the statements are true.</td></tr>
<tr><td>6</td><td>a) Both the statements are true</td></tr>
<tr><td>7</td><td>(d) Mode</td></tr>
<tr><td>8</td><td>c) 100</td></tr>
<tr><td>9</td><td>(a) Positive and linear</td></tr>
<tr><td>10</td><td>e) Both Assertion A and reason R are true and Reason R is the correct explanation of Assertion A</td></tr>
<tr><td>11</td><td>
<table>
<tr><td>Item</td><td>Price in 2014(Rs)</td><td>Price in 2019(Rs)</td><td>Weight (%)</td><td>R=$\frac{P1}{P0}$x100</td><td>WR</td></tr>
<tr><td>Food</td><td>200</td><td>280</td><td>30</td><td>140</td><td>4200</td></tr>
<tr><td>Rent</td><td>100</td><td>200</td><td>20</td><td>200</td><td>4000</td></tr>
<tr><td>Clothing</td><td>150</td><td>120</td><td>20</td><td>80</td><td>1600</td></tr>
<tr><td>Fuel and Lighting</td><td>50</td><td>100</td><td>10</td><td>200</td><td>2000</td></tr>
<tr><td>Miscellaneous</td><td>100</td><td>200</td><td>20</td><td>200</td><td>4000</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>$\sum$WR=15800</td></tr>
</table>
CPI= $\frac{\sum WR}{\sum R}$ =15800/ 100 =158
Steps – 2 marks
Equation ½ marks
Final answer ½ marks
Or
An index number is astatistical device for measuring changes in the magnitude of related variables (1 mark)
Helpful in formulation of policies
</td></tr>
</table>

Helpful in measuring inflation and deflation
Useful to business man
Useful to assess exportsa and imports (Any two points with explanation- 2 marks)

12

Rank by judge 1- R1	Rank by judge2 R2	D=R1-R2	D^2
1	4	-3	9
2	2	0	0
3	1	2	4
4	3	1	1
5	5	0	0
			$\sum D^2$=14

The rank correlation rk =1-$\frac{6\sum D^2}{N^3-N}$ = 1-$\frac{84}{120}$ = 1-0.7=0.3
Calculation of $\sum D^2$- 1.5 marks
Formule – 1/2 mark
Assigining values -1/2 mark
Final answer- ½ mark

13

a- Relative importance of items – 1 mark
b- Helpful in forecasting the demand and supply conditions in the economy
Help us to understand monetary and real value of macro aggregates like national income and output
Or any other valid points - 2 marks

c .Wholesale price index- 1 mark

14

Highest frequency 25. Hence modal class is 20-25 –
Z= L1+$\frac{f1-fo}{2f1-f0-f2}$x i
20+$\frac{25-20}{2\times25-10-24} \times 5 = 20 + 4.68 = 24.68$
Finding modal class -1/2 marks
Formulae- 1 mark
Assigining values and calculation- 2 marks
Final answer – ½ marks

15

The difference between the actual value of a parameter of the population and its estimate (from the sample) is the sampling error – 1 mark
By taking large samples – 1 mark
i.sampling bias
ii. non-response errors
iii. errors in data acquisition (point with explanation- 2 marks)
Or
A survey which covers every element of the population is known as census while a survey is done in smaller group selected from the population is known as sample survey – 2 marks
A sample can provide reasonably reliable and accurate information at a lower cost ans shorter time
As samples are smaller than population, more detailed information can be collected by conducting intensive enquiries
Any other valid points- 2 marks

16

a. Coefficient of correlation has no unit. It is a pure number

The value of the correlation coefficient ranges from plus one to minus one

A negative value of coefficient of correlation indicates an inverse relation (any two points -2 marks

b

X	X^2	Y	Y^2	XY
4	16	6	36	24
6	36	8	64	48
8	64	10	100	80
10	100	12	144	120
12	144	14	196	168
$\sum$X=40	$\sum X^2$ =360	$\sum$Y=50	$\sum Y^2$ =540	$\sum$XY=440

$$r=\frac{N.\sum XY-\sum X.\sum Y}{\sqrt{N.\sum X^2-\sum X^2}\ X\sqrt{N.\sum Y^2-(\sum Y)^2}}$$

$$=\frac{5\times440-40\times50}{\sqrt{5\times360-(40)^2}\times\sqrt{5\times540-50^2}}$$

$$=\frac{2200-2000}{\sqrt{1800-1600}\times\sqrt{2700-2500}}$$

$$=\frac{200}{\sqrt{200\times\sqrt{200}}}=\frac{200}{200}=1$$

Formula -1 mark

Assigining values and calculation – 2 marks

Final answer – 1 marks

17

a.A variable is a characteristic which is capable of being mmeasured and capable of change in its value from time to time- 1 mark

Discrete variable- These variables are finite and are not expressed as range

Continuous variable- These variables are expressed in fractions or in ranges- 1 mark

b. Preparation of lessthan more than frequency table – 1 mark

Drawing of ogive – 2 mark

Finding of median – 1 mark

Or

a. Merit- simplest form of data presentation
   - It facilitates comparison

Demerts- Not attractive
   - Do not leave everlasting effect on mind of the reader (2 marks)

		Weekly wages	No of workers	Adjustment factor	Adjusted frequency
		10-15 15-20 20-25 25-30 30-40 40-60	4 16 24 32 40 48	5/5=1 5/5=1 5/5=1 5/5=1 10/5=2 20/5=4	4 16 24 32 20 12
		Preparation of adjusted frequency – 2 marks Histogram – 2 marks			
	Part B – Introductory Microeconomics				
18	f) There are inequalities of income in our country Or d.The choice of goods and services				
19	a.Decrease in the price of apple				
20	a. Price of the commodity				
21	c. C-iii				
22	c) Statement 1 is true and Statement 2 is false				
23	d. Rise in price of other goods				
24	b. 20 units				
25	a. Price ceiling				
26	e. Both Assertion A and reason R are true and Reason R is the correct explanation of Assertion A				
27	g) Assertion A is true but Reason R is false				
28	Marginal opportunity cost/Marginal rate of transformation – 1 mark				
	combination	Good X	Goood Y	MRT	
	A B C D E F	0 1 2 3 4 5	15 14 12 9 5 0	1Y:1X 1Y:1X 2Y:1X 3Y:1X 4Y:1X 5Y:1X	
	Explanation – 2 marks				
29	Here % change in demand= $\frac{5}{20}$x 100=25% - 1mark % change in price= 20% Ed= % change in demand/% change in price- 1 mark = $\frac{-25}{20}$= ½ mark -1.25 ½ mark Or TE= pxq= 5x 20= 100 - ½ marks When e=1 TE does not change with change in price – 1 marks Q= TE/P when p=4 - 1 mark Q= 100/4=25 units – ½ mark				

30	a-i. True when price x increase people will demand more of Y so demand curve for Y will shift rightward – 1 mark ii. Fale- Marginal utility is zero – 1 mark Rise in demand due to fall in price is known as extension of demand while more is demanded at same price is known as Increase in demand – 2 marks
31	a. Large no of buyers and sellers, Homogeneous products, perfect knowledge, Free entry and exit (any one- 1 mark) b. Excees demand- competition among buyers- Increase in market price- contraction of demand – extension of supply-process continues till price rises to equilibrium price – 2marks c. Price floor refers to imposition of a lower limit on the price of a good by government- 1 mark
32	a. Producer is equilibrium at 6 units of output –(2 marks) MC= MR MC rising after 6 th level of output- 2 marks Or a. Whem MR<AR ,AR falls When MR=AR, AR is constant When MR>AR , AR rises – 2 marks b. Price of other related goods Price of input State of technology Government policies Any two points with explanation – 2 marks
33	a. Indifference curve is downward sloping It is convex to origin Higher indifference curve shows higher level of satisfaction- any two with explanation – 3 marks b. No consumer is not in equilibrim Here MRS is not equal to price ratio Here MRS > price ratio ie, 3>1.- 1 mark It means consumer is ready to sacrifice more units of good y to get an extra uinit of x than market demands. When consumer buys more units of MRS will fall and process continues till MRS=price ratio – 2 marks
34	Increasing returns to a factor- MP increases, TP increases at an increasing rate Diminishing returns to a factor- MP diminishes, TP increase at diminishing rate Negative returns to a factor- MP becomes negative TP starts to fall – 3 marks Correct diagram with explanation – 3 marks OR TFC Expenditure incurred on fixed factors of production It does not vary with output TVC Expenditure incurred on variable factors of production It varies with outpt - 2 marks Diagram- 1 mark

	a. MC is the addition made to total cost when one more unit of output is produced- 1 mark b. It is because of law of variable proportion – with explanation – 2 marks

SAMPLE QUESTION PAPER-3

General Instructions:

i) All questions in both the sections are compulsory.

ii) Marks for questions are indicated against each.

iii) Question numbers 1-10 and 18-27 are very short-answer questions carrying 1 mark each.

iv) Question numbers 11-12 and 28-29 are short answer questions carrying 3 marks each. Answers to them should normally not exceed 60 words each.

v) Question numbers 13-15 and 30-32 are also short answer questions carrying 4 marks each. Answers to them should not normally exceed 70 words each.

vi) Question numbers 16-17 and 33-34 are long answer questions carrying 6 marks each. Answers to them should not exceed 100 words each.

सामान्य निर्देश:

i) दोनों अनुभागों में सभी प्रश्न अनिवार्य हैं।

ii) प्रत्येक प्रश्न के सामने अंक दर्शाए गए हैं।

iii) प्रश्न संख्या 1-10 और 18-27 अति लघु उत्तरीय प्रश्न हैं, प्रत्येक प्रश्न 1 अंक का है।

iv) प्रश्न संख्या 11-12 और 28-29 लघु उत्तरीय प्रश्न हैं जिनमें से प्रत्येक के लिए 3 अंक हैं। इनके उत्तर सामान्यतः 60 शब्दों से अधिक नहीं होने चाहिए।

v) प्रश्न संख्या 13-15 और 30-32 भी लघु उत्तरीय प्रश्न हैं जिनमें से प्रत्येक के लिए 4 अंक हैं। इनके उत्तर सामान्यतः 70 शब्दों से अधिक नहीं होने चाहिए।

vi) प्रश्न संख्या 16-17 और 33-34 दीर्घ उत्तरीय प्रश्न हैं जिनमें से प्रत्येक 6 अंक का है। प्रत्येक का उत्तर 100 शब्दों से अधिक नहीं होना चाहिए।

खंड - अ

SECTION – A (STATISTICS)

1.Resources to satisfy human wants have _____ uses. (1)

Maximum b) few

Alternative d) none of the above

मानवीय आवश्यकताओं को पूरा करने के लिए संसाधनों का _____ उपयोग होता है

ए) अधिकतम बी) कुछ

सी) वैकल्पिक डी) उपरोक्त में से कोई नहीं

2.Which of the following is correct regarding Statistics? (1)

a) Aggregates of facts b) numerically expressed

c) affected by multiplicity of causes d) All of these

2.सांख्यिकी के संबंध में निम्नलिखित में से कौन सा सही है?
ए) तथ्यों का समुच्चय बी) संख्यात्मक रूप से व्यक्त
सी)) कारणों की बहुलता से प्रभावित डी) इन सभी से

3. The aggregate of data is called:
a) Statistics b) editing of data
c) analysis of data d) none of these

3. डेटा के समुच्चय को कहा जाता है: (1)
ए) सांख्यिकी बी) डेटा का संपादन
सी) डेटा का विश्लेषण डी) इनमें से कोई नहीं

4. Read the following statements carefully and choose the correct alternative from the following:
Statement 1 – Primary data are original and secondary data are already in existence and therefore, are not original.
Statement 2 – Primary data need adjustment to suit the objective of study in hand. Alternatives:
Both the statements are true.
Both the statements are false.
Statement 1 is true and Statement 2 is false
Statement 2 is true and Statement 1 is false.

4. निम्नलिखित कथनों को ध्यानपूर्वक पढ़ें और निम्नलिखित में से सही विकल्प चुनें:
कथन 1 - प्राथमिक डेटा मूल हैं और द्वितीयक डेटा पहले से ही अस्तित्व में हैं और इसलिए, मूल नहीं हैं।
कथन 2 - प्राथमिक डेटा को अध्ययन के उद्देश्य के अनुरूप समायोजन की आवश्यकता है। विकल्प:
ए) दोनों कथन सत्य हैं।
बी) दोनों कथन गलत हैं।
सी) कथन 1 सत्य है और कथन 2 गलत है
डी) कथन 2 सत्य है और कथन 1 गलत है।

5.Read the following Case Study carefully and answer following question: (1)
Text, tables, and graphs are effective communication media that present and convey data and information. They aid readers in understanding the content of research, sustain their interest, and effectively present large quantities of complex information. As journal editors and reviewers will scan through these presentations before reading the entire text, their importance cannot be disregarded. For this reason, authors must pay as close attention to selecting appropriate methods of data presentation as when they were collecting data of good quality and analyzing them. In addition, having a well-established understanding of different methods of data presentation and their appropriate use will enable one to develop the ability to recognize and interpret inappropriately presented data or data presented in such a way that it deceives readers.

Which Graph is used to present BSE Sensex? (1)
a) Histogram (b) Ogive (c) Time series Graph d) Pie Diagram

5.निम्नलिखित केस स्टडी को ध्यानपूर्वक पढ़ें और निम्नलिखित प्रश्न का उत्तर दें:

टेक्स्ट, टेबल और ग्राफ़ प्रभावी संचार माध्यम हैं जो डेटा प्रस्तुत और संप्रेषित करते हैं
और जानकारी. वे पाठकों को शोध की सामग्री को समझने, उनकी रुचि बनाए रखने और बड़ी मात्रा में जटिल जानकारी को प्रभावी ढंग से प्रस्तुत करने में सहायता करते हैं। चूंकि जर्नल संपादक और समीक्षक संपूर्ण पाठ पढ़ने से पहले इन प्रस्तुतियों को स्कैन करेंगे, इसलिए उनके महत्व को नजरअंदाज नहीं किया जा सकता है। इस कारण से, लेखकों को डेटा प्रस्तुति के उचित तरीकों का चयन करने पर उतना ही ध्यान देना चाहिए जितना कि जब वे अच्छी गुणवत्ता का डेटा एकत्र कर रहे थे और उनका विश्लेषण कर रहे थे। इसके अलावा, डेटा प्रस्तुति के विभिन्न तरीकों और उनके उचित उपयोग की अच्छी तरह से स्थापित समझ होने से व्यक्ति अनुचित रूप से प्रस्तुत डेटा या इस तरह से प्रस्तुत किए गए डेटा को पहचानने और व्याख्या करने की क्षमता विकसित करने में सक्षम हो जाएगा कि यह पाठकों को धोखा दे।

ए) हिस्टोग्राम (बी) ऑगिव
सी) समय श्रृंखला ग्राफ़ डी) पाई आरेख

6. Which of the following shows highest degree of correlation? (1)
a) -0.1 b) 0.9 c) 0.8 d) 0.7
6. निम्नलिखित में से कौन सहसंबंध की उच्चतम डिग्री दर्शाता है?
ए) -0.1 (बी) 0.9 सी) 0.8 डी) 0.7

7. Personal bias is possible under: (1)
a) random sampling b) purposive sampling
c) stratified sampling d) quota sampling

निम्नलिखित के अंतर्गत संभव है:
ए) यादृच्छिक नमूनाकरण बी) उद्देश्यपूर्ण नमूनाकरण
सी) स्तरीकृत नमूनाकरण डी) कोटा नमूनाकरण

8.Arithematic mean of a series is 15 and 5 is added in all the items of this series, the new arithmetic mean will be:
a) 5 b) 20
c) 18 d) 10

8.एक श्रृंखला का अंकगणितीय माध्य 15 है और इस श्रृंखला की सभी वस्तुओं में 5 जोड़ा जाता है, नया अंकगणितीय माध्य होगा:
ए) 5 बी) 20 सी) 18 डी) 10

9. Ogives can be helpful in locating graphically (1)
a) Mean b) Mode
c) Median d) None of these

9. ऑगाइव्स ग्राफ़िक रूप से पता लगाने में सहायक हो सकते हैं
ए) माध्य बी) मोड
सी) माध्यिका डी) इनमें से कोई नहीं

10. The sum of deviations of individual items of a series from arithmetic mean is: (Choose the correct alternative) (1)
(a) Less than zero (b) More than zero
(c) Equal to zero (d) None of these

10. अंकगणितीय माध्य से एक श्रृंखला की व्यक्तिगत वस्तुओं के विचलन का योग है: (चुनें सही विकल्प)

(ए) शून्य से कम (बी) शून्य से अधिक
(सी) शून्य के बराबर (डी) इनमें से कोई नहीं

11. What is the difference between positive and negative correlation? (3)
सकारात्मक और नकारात्मक सहसंबंध के बीच क्या अंतर है?

12. Define and explain the concepts of mean, median, and mode (3)

12. माध्य, माध्यिका और बहुलक की अवधारणाओं को परिभाषित करें और समझाएं

13. Distinguish between random sampling and non-random sampling. Give examples of both. (4)
OR
What precautions must be taken while preparing a questionnaire?

13. यादृच्छिक प्रतिचयन और गैर-यादृच्छिक प्रतिचयन के बीच अंतर स्पष्ट करें। दोनों के उदाहरण दीजिए.
या
प्रश्नावली तैयार करते समय क्या सावधानियाँ बरतनी चाहिए?

14. Calculate the mean and median for the following data set: 10, 15, 20, 25, 30. (4)
14. निम्नलिखित डेटा सेट के लिए माध्य और माध्यिका की गणना करें: 10, 15, 20, 25, 30

15. Draw multiple bar diagram to show the following data: (4)

Student	A	B	C
Marks in Economics	40	35	30
Marks in English	30	15	25

15. निम्नलिखित डेटा दिखाने के लिए एकाधिक बार आरेख बनाएं:

छात्र	ए	बी	सी
अर्थशास्त्र में अंक	40	35	30
अंग्रेजी में अंक	30	15	25

16. Define correlation. Explain its various kinds. (4)
OR
From the following data, Calculate coefficient of Correlation.

X	2	3	4	5	6	7	8
Y	4	7	8	9	10	14	18

सहसंबंध को परिभाषित करें। इसके विभिन्न प्रकार बताइये
या

निम्नलिखित डेटा से, सहसंबंध के गुणांक की गणना करें।

X	2	3	4	5	6	7	8

Y	4	7	8	9	10	14	18

17. What do you mean by index numbers? Describe briefly the problems involved in the Construction of index number of prices. (6)

OR

What is an index number? Point out its uses.

सूचकांक संख्याओं से आप क्या समझते हैं? कीमतों के सूचकांक के निर्माण में शामिल समस्याओं का संक्षेप में वर्णन करें।

या

सूचकांक संख्या क्या है? इसके उपयोग बताइये।

SECTION-B

18. When marginal utility is zero, total utility is: (Choose the correct alternative) (1)

a) Zero b) Minimum c) Maximum d) Falls but remains positive

18.जब सीमांत उपयोगिता शून्य है, तो कुल उपयोगिता है: (सही विकल्प चुनें)

(ए) शून्य बी) न्यूनतम (सी) अधिकतम (डी) गिरता है लेकिन सकारात्मक रहता है

19. If Marginal Rate of Substitution (MRS) is diminishing, the shape of Indifference (1) curve will be- (Choose the correct alternative)

Horizontal and Parallel to X-axis

Downwards sloping and convex to the origin

Downwards sloping and concave to the origin

Downward sloping straight line

19. यदि सीमांत प्रतिस्थापन दर (MRS) कम हो रही है, तो उदासीनता वक्र का आकार होगा- (सही विकल्प चुनें)

ए) क्षैतिज और एक्स-अक्ष के समानांतर

बी) नीचे की ओर झुका हुआ और मूल की ओर उत्तल

सी) नीचे की ओर झुका हुआ और मूल बिंदु तक अवतल

डी) नीचे की ओर झुकी हुई सीधी रेखा

20. When average revenue is Rs 50 andoutput is equal to 15 units, total revenue will be:

a) Rs 735 b) Rs 750

c) Rs 745 d) Rs 760

जब औसत राजस्व 50 रुपये है और आउटपुट 15 इकाइयों के बराबर है, तो कुल राजस्व होगा:

ए) 735 रुपये बी) 750 रुपये

सी) 745 रुपये डी) 760 रुपये

ए) निम्नतर अच्छा बी) स्थानापन्न अच्छा सी) पूरक अच्छा डी) सामान्य अच्छा

21. Availability of close substitutes makes the demand: (1)
a) less elastic b) more elastic
c) parallel to X axis d) parallel to Y axis
21. निकट स्थानापन्न की उपलब्धता मांग बनाती है:
ए) कम लोचदार बी) अधिक लोचदार
सी) एक्स अक्ष के समानांतर डी) वाई अक्ष के समानांतर
22. If Es=0.6, and the percentage in price =5, then percentage change in quantity supplied is: (1)
8.3 c) 5.6
4.5 d) 3
22. यदि Es=0.6, और कीमत में प्रतिशत =5, तो आपूर्ति की गई मात्रा में प्रतिशत परिवर्तन है:
ई) 8.3 सी) 5.6
एफ) 4.5 डी) 3
23. Per unit cost of a good is called: (1)
a) fixed cost b) variable cost
c) average cost d) none of these
23. किसी वस्तु की प्रति इकाई लागत कहलाती है:
ए) निश्चित लागत बी) परिवर्तनीय लागत
सी) औसत लागत डी) इनमें से कोई नहीं

24. Read the following statements- Assertion (A) and Reason (R). Choose one of the Correct alternatives given below: (1)
Assertion (A): Total product increases at increasing rate only when marginal product increases.
Reason (R): TP falls or rises so long as MP is Rising or falling
Alternatives: -
a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)
c)Assertion (A) is true but Reason (R) is false.
d)Assertion (A) is false but Reason (R) is true.

24. निम्नलिखित कथन पढ़ें- दावा (ए) और कारण (आर)। नीचे दिए गए सही विकल्पों में से एक चुनें:
अभिकथन (ए): कुल उत्पाद तभी बढ़ती दर से बढ़ता है जब सीमांत उत्पाद बढ़ता है।
कारण (आर): टीपी तब तक गिरता या बढ़ता है जब तक एमपी बढ़ रहा है या गिर रहा है

विकल्प: -
ए) दावा (ए) और कारण (आर) दोनों सत्य हैं और कारण (आर) दावे (ए) का सही स्पष्टीकरण है
बी) दावा (ए) और कारण (आर) दोनों सत्य हैं और कारण (आर) दावे (ए) का सही स्पष्टीकरण नहीं है
सी) दावा (ए) सत्य है लेकिन कारण (आर) गलत है।
डी) दावा (ए) गलत है लेकिन कारण (आर) सच है
25. In case of perfect competition: (1)
a) a firm is able to charge higher price
b) a firm is able to charge uniform price
c) a firm is able to sell any amount at prevailing price
d) both (b) and (c)
25. पूर्ण प्रतियोगिता की स्थिति में:
ए) एक फर्म अधिक कीमत वसूलने में सक्षम है
बी) एक फर्म एक समान कीमत वसूलने में सक्षम है

सी) एक फर्म प्रचलित कीमत पर किसी भी राशि को बेचने में सक्षम है
डी) दोनों (बी) और (सी)

26. When MC is equal to MR, while maximizing profit, then- (1)
a) Marginal Cost must be rising b) Marginal Cost must be falling
c) Marginal Cost must be constant d) None of these

26. जब अधिकतम लाभ प्राप्त करते समय MC, MR के बराबर हो, तो-
ए) सीमांत लागत बढ़ रही होगी बी) सीमांत लागत गिर रही होगी
सी) सीमांत लागत स्थिर होनी चाहिए डी) इनमें से कोई नही

27.कुल राजस्व और कुल लागत के बीच अंतर अधिकतम होता है जब
ए) एआर = एमआर बी) एमआर = एमसी
सी) एमआर = एसी डी) एमसी = एसी

28. Marginal cost is only a variable cost. Why? (3)
OR
Explain the conditions of producer's equilibrium in terms of marginal revenue and marginal cost. (Use diagram).

28. सीमांत लागत केवल एक परिवर्तनीय लागत है। क्यों?
या
सीमांत राजस्व और सीमांत लागत के संदर्भ में उत्पादक के संतुलन की शर्तों की व्याख्या करें। (आरेख का उपयोग करें) ।

29. How is the seller under perfect competition, a price taker not a price maker? What is the relevance of the feature that 'there are large number of sellers' in this context? (3)
29. विक्रेता पूर्ण प्रतिस्पर्धा में कैसे है, कीमत लेने वाला नहीं कीमत बनाने वाला? इस संदर्भ में इस विशेषता की प्रासंगिकता क्या है कि 'विक्रेता बड़ी संख्या में हैं'?

30. Massive unemployment shifts Production possibility Curve (PPC) to the left. Defend or Refute. (4)
OR
Explain what to produce as an economic problem.
30.भारी बेरोजगारी उत्पादन संभावना वक्र (पीपीसी) को बाईं ओर स्थानांतरित कर देती है। बचाव करें या खंडन करें।
या
बताएं कि आर्थिक समस्या के रूप में क्या उत्पादन करना है।

31. Explain the law of diminishing marginal utility. How does it affect consumer behavior? (4)
31. ह्रासमान सीमांत उपयोगिता के नियम की व्याख्या करें। यह उपभोक्ता व्यवहार को कैसे प्रभावित करता है?

32.Do you agree with the view that buffer stock is atool of price floor? (4)
क्या आप इस विचार से सहमत हैं कि बफर स्टॉक मूल्य निर्धारण का एक उपकरण है?

33. Why should a consumer purchase more of a commodity when MU must decline as consumption of commodity increases? (6)
OR
Diagrammatically show consumer's equilibrium using indifference curve analysis. Also analyze the conditions of consumer's equilibrium.
33. किसी उपभोक्ता को किसी वस्तु की अधिक खरीदारी क्यों करनी चाहिए जबकि वस्तु की खपत बढ़ने पर एमयू में गिरावट आनी चाहिए?
या

उदासीनता वक्र विश्लेषण का उपयोग करके उपभोक्ता के संतुलन को आरेखीय रूप से दिखाएं। उपभोक्ता संतुलन की स्थितियों का भी विश्लेषण करें।

34. In short period of Production Process few factors remain fixed and all other (6)
factors remain variable in production. As a result, in production three phases operate: Increasing Returns to factor, Constant Return to factor and Diminishing Returns to factor. The total product and Marginal Product behaviour also change as more and more Variable factor is
added to fixed factor. In initial stages due to optimum combination in production, efficient management and cheap inputs, production increases later stage due to fixity of factors production starts decreasing.
Explain the different phases in the Law of Variable Proportion.
Give reason for decreasing return to factor
34. उत्पादन प्रक्रिया की अल्प अवधि में कुछ कारक स्थिर रहते हैं तथा अन्य सभी कारक उत्पादन में परिवर्तनशील रहते हैं। परिणामस्वरूप, उत्पादन में तीन चरण संचालित होते हैं: कारक पर बढ़ता रिटर्न, कारक पर लगातार रिटर्न और कारक पर घटता रिटर्न। अधिक से अधिक परिवर्तनीय कारक होने पर कुल उत्पाद और सीमांत उत्पाद व्यवहार भी बदल जाता है. निश्चित कारक में जोड़ा गया। प्रारंभिक अवस्था में उत्पादन में इष्टतम संयोजन, कुशल प्रबंधन और सस्ते इनपुट के कारण उत्पादन बढ़ता है, बाद में कारकों की निश्चितता के कारण उत्पादन कम होने लगता है।
ए) परिवर्तनीय अनुपात के नियम के विभिन्न चरणों की व्याख्या करें।
बी) कारक पर रिटर्न कम होने का कारण बताएं।

MARKING SCHEME- SQP-3

1.c) Alternative
2. d) All of these
3. a) Statistics
4. c) Statement 1 is true and Statement 2 is false.
5. c) Time Series Graph
6. -1.0
7. b) purposive sampling
8. d) 10
9.c) median
10. c) equal to zero
11. The difference between positive and negative correlation is that in positive correlation, variables move in the same direction whereas in the negative correlation, they move in different directions.
12. Mean -mean is simple average of all items in a series. It is number obtained by adding the values of all the items of a series and diving the total by the total number of observations
Median -Median is a positional average. It is located centrally in a series in such a way that half of the value of the series are above it and other half below it.
Mode – Mode is the value which occur most frequently in the series.
13.

Random sampling	Non-random sampling
Random sampling gives each item an equal chance of being selected in the sample.	Non-random sampling is based on judgement, purpose, convenience and experience of the investigator.

OR
Following precautions must be taken while preparing questionnaire:
It includes precise and short questions.
It has a reasonable length.
Questions should be arranged logically.
Questions should not be ambiguous

Personal questions should be avoided.
It should have clear instructions.

14. Mean ($\bar{x}$)= sum of observations / number of observations

$\bar{x}$=10+15+20+25+30/5=100/5

x=20

Median (Me)= n+1/2

Me= 5+1/2=6/2

Me= 3rd item in the series

Me= 20

15. scale, index -1 mark

Diagram and labelling- 2 marks

16. Correlation is a statistical measure that expresses the relationship between variables, like between price and supply.

Types of correlation:

Positive correlation: when two variables change in same direction is called positive correlation

Negative correlation: When two variables change in different directions is called negative correlation

Linear correlation: When two variables move in constant proportion, is called linear correlation.

When two variables don't change in constant proportion, is called non- linear correlation.

Or

16.steps 4 marks

Formula 1 mark

Coefficient of correlation (r) = + 0.96 (1 mark)

It is a situation of high positive correlation.

17. An index number is a statistical measure designed to show changes in a group of related variables.

Problems in the construction of index number:

Purpose of index number

Selection of base year

Selection of goods and services

Selection of the prices of goods and services

Find the average prices

Selection of method of weighting

Selection of formula

Or

An index number is a statistical measure designed to show changes in a group of related variables.

Some important uses of index number are as follows:

Measurement of change in the price level

Useful to business class in their planning and decisions

Information regarding production

Adjustment in salaries and allowances of the workers

Help to ascertain standard of living of people

Useful to government in determining its monetary and fiscal policies.

18. (c)maximum

19.(b) Downwards sloping and convex to the origin

20. b) Rs 750

21. b) more elastic

22. d) 3

23. c) average cost

24. a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

25. d) both (b) and (c)

26. Marginal Cost must be rising
27. b) MR = MC
28. Marginal cost is an additional cost corresponding to an additional unit of output. Additional cost cannot be fixed cost, it can be variable cost. Accordingly, the sum total of marginal cost corresponding to different units of output becomes Total variable cost. (2 marks)
Diagram 1 mark
29. Price is determined by the forces of market demand and market supply. Firm sells its output at the given price. Therefore, a firm under perfect competition is a price taker, not a price maker. The number of firms selling a product is so large that no individual firm can make any meaningful difference in the total market supply. Accordingly, an individual firm cannot influence the market price. A firm is to take the price as given.
30. PPC is drawn on the assumption that the given resources are fully and efficiently utilized. Unemployment is a situation when resources are not fully utilized. It would mean that the economy is not operating on the PPC but somewhere inside the PPC. PPC would not shift.

OR

What to produce is essentially the problem of choice: what quantity of goods is to be produced. More of one good must lead to lesser production of the other. Because, resources are given and technology is constant.

31. law of diminishing marginal utility states that as more and more units of a commodity are consumed, marginal utility derived from every additional unit decline. Psychologically, intensity of desire for a commodity decreases as more and more units of a commodity are consumed. (2 marks)
Table and diagram (2 marks).

32. Buffer stock is an important tool of price floor. Floor price is minimum price higher than the equilibrium price. It is fixed by the government for sale of a good in the market. The government buys the surplus stock of the famers at the floor price if they fail to sell in the market. The government creates its own buffer stock by buying the surplus stock. Thus, buffer stock is a tool of the price floor.
33. In equilibrium Px = MUx (in terms of money). The consumer will continue purchasing more of a commodity so long as MUx > Px even when MUx is decreasing.

OR

Consumer's equilibrium refers to optimum choice of the consumer. It is reached when he maximizes his satisfaction. In terms of indifference curve analysis, the consumer reaches his optimum choice when two conditions are satisfied:
MRS = Px/Py
Slope of IC = slope of price line
At the point of equilibrium, IC and price line are tangent to each other.
IC is convex at the point of equilibrium.

It is assumed that the consumer is spending his given income on Good X and Good Y only and Px and Py are given in the market.
Diagram – 2 marks.
34. a) Law of Variable proportions states that as more and more units of the variable factor is combined with the fixed factor, marginal product of the variable factor may initially rise, but eventually a situation comes when marginal product of the variable factor starts declining. Marginal product may become zero an even negative.
b) i) Fixity of the factor
ii)Imperfect factor substitutability
iii) Poor coordination between the factors

UNSOLVED SAMPLE QUESTION PAPERS

SAMPLE QUESTION PAPER-1

GENERAL INSTRUCTIONS:
1. This question paper contains two sections:
Section A – Statistics
Section B – Micro Economics
2. This paper contains 20 Multiple Choice Questions type questions of 1 mark each.
3. This paper contains 4 Short Answer type questions of 3 marks each to be answered in 60 to 80 words.
4. This paper contains 6 Short Answer type questions of 4 marks each to be answered in 80 to 100 words.
5. This paper contains 4 Long Answer type questions of 6 marks each to be answered in 100 to 150 words.

सामान्य निर्देश:
1. इस प्रश्न पत्र में दो खंड हैं:
खंड ए - सांख्यिकी
खंड बी - सूक्ष्म अर्थशास्त्र
2. इस पेपर में 20 बहुविकल्पीय प्रश्न हैं, जिनमें से प्रत्येक 1 अंक का है।
3. इस पेपर में 4 लघु उत्तरीय प्रश्न हैं, जिनमें से प्रत्येक 3 अंक का है, जिनका उत्तर 60 से 80 शब्दों में देना है।
4. इस पेपर में 6 लघु उत्तरीय प्रश्न हैं, जिनमें से प्रत्येक 4 अंक का है, जिनका उत्तर 80 से 100 शब्दों में देना है।
5. इस पेपर में 4 दीर्घ उत्तरीय प्रश्न हैं, जिनमें से प्रत्येक 6 अंक का है, जिनका उत्तर 100 से 150 शब्दों में देना है।

Q NO	SECTION A- STATISTICS	
1	Which of the following statement can be called Statistics? (a) Technology of Japan is very advanced (b) Dhanveer has a 2000 rupee note in his pocket. (c) India has Per Capita Income of Rs.20,000 per annum (d) USA is the richest country in the world. निम्नलिखित में से किस कथन को सांख्यिकी कहा जा सकता है? (a) जापान की तकनीक बहुत उन्नत है (b) धनवीर की जेब में 2000 रुपये का नोट है। (c) भारत की प्रति व्यक्ति आय 20,000 रुपये प्रति वर्ष है (d) संयुक्त राज्य अमेरिका दुनिया का सबसे अमीर देश है।	1
2	What is the name of the monthly price index that takes price changes in consumer goods and services and uses it to determine changes in the price of those products over a period of time? Wholesale price index Consumer price index Paasche's index None of the above मासिक मूल्य सूचकांक का नाम क्या है जो उपभोक्ता वस्तुओं और सेवाओं में मूल्य परिवर्तन लेता है और इसका उपयोग समय अवधि में उन उत्पादों की कीमत में परिवर्तन निर्धारित करने के लिए करता है? a) थोक मूल्य सूचकांक b) उपभोक्ता मूल्य सूचकांक c) पाशे का सूचकांक d) उपरोक्त में से कोई नहीं	1

3 Identify the correctly matched item from column 1 to that off column II 1

कॉलम 1 से कॉलम II से सही सुमेलित आइटम की पहचान करें

Column I	Column II
A. Histogram	i) Drawn by using frequency
B. Pie chart	ii) Drawn by using class interval
C. Frequency curve	iii) Straight line curve
D. Bar graph	iv) Drawn by joining mid points

a) A– i b) B – ii c) C– iii d) D- iv

4 Which of the following statement is/are TRUE? 1

i. Collection of data is the first stage of statistical study

ii. The data collected from the source of origin for the first time is known as internal data

iii. The collection of information through a questionnaire is a method for the gathering of secondary data

Only i, b) i and iii c) i and ii d) i, ii and iii

निम्नलिखित में से कौन सा कथन सत्य है/हैं

i. आंकड़ों का संग्रह सांख्यिकीय अध्ययन का पहला चरण है

ii. मूल स्रोत से पहली बार एकत्र किए गए आंकड़ों को आंतरिक डेटा के रूप में जाना जाता है

iii. प्रश्नावली के माध्यम से जानकारी का संग्रह द्वितीयक डेटा एकत्र करने की एक विधि है

a) केवल i, b) i और iii c) i और ii d) i, ii और iii

5 Read the statements carefully and choose the correct alternative among those given below; 1

Alternatives:

(a) Both the statements are True

(b) Both the statements are False

(c) Statement 1 is True and Statement 2 is False

(d) Statement 2 is True and Statement 1 is False

Statement 1: Median value is based on all the items of the series

Statement 2: Mode of a series cannot be graphically located

OR

Read the statements carefully and choose the correct alternative among those given below;

Alternatives:

(a) Both the statements are True

(b) Both the statements are False

(c) Statement 1 is True and Statement 2 is False

(d) Statement 2 is True and Statement 1 is False

Statement 1: Arithmetic mean is not affected by extreme values

Statement 2: The Mean Value always figure out in the series

कथनों को ध्यानपूर्वक पढ़ें और नीचे दिए गए विकल्पों में से सही विकल्प चुनें;

विकल्प:

(a) दोनों कथन सत्य हैं

(b) दोनों कथन असत्य हैं

(c) कथन 1 सत्य है और कथन 2 असत्य है

(d) कथन 2 सत्य है और कथन 1 असत्य है

कथन 1: माध्यिका मान श्रृंखला के सभी मदों पर आधारित होता है

कथन 2: श्रृंखला का बहुलक ग्राफ़िक रूप से स्थित नहीं किया जा सकता

या

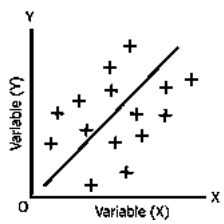
कथनों को ध्यानपूर्वक पढ़ें और नीचे दिए गए विकल्पों में से सही विकल्प चुनें;
विकल्प:
(a) दोनों कथन सत्य हैं
(b) दोनों कथन असत्य हैं
(c) कथन 1 सत्य है और कथन 2 असत्य है
(d) कथन 2 सत्य है और कथन 1 असत्य है
कथन 1: अंकगणितीय माध्य चरम मानों से प्रभावित नहीं होता
कथन 2: माध्य मान हमेशा श्रृंखला में ही पता लगाया जाता है

6 Array gives some orders to data by placing the…… 1
a. Both Highest magnitudes first followed by other magnitudes in descending order and Lowest magnitude first followed by other magnitudes in ascending order
b. Lowest magnitude first followed by other magnitudes in ascending order
c. Highest magnitude first followed by other magnitudes in descending order
d. None of these
सरणी डेटा को कुछ क्रम देती है, जिसमें ..... रखा जाता है।
a. सबसे अधिक परिमाण पहले, उसके बाद अवरोही क्रम में अन्य परिमाण और सबसे कम परिमाण पहले, उसके बाद आरोही क्रम में अन्य परिमाण।
b. सबसे कम परिमाण पहले, उसके बाद आरोही क्रम में अन्य परिमाण।
c. सबसे अधिक परिमाण पहले, उसके बाद अवरोही क्रम में अन्य परिमाण।
d. इनमें से कोई नहीं

7 Read the following statements carefully and choose the correct alternative from the following 1
Statement 1: An index number is a statistical device for measuring absolute change in a group of related variables over different time period.
Statement 2: Consumer Price Index measures the average change in retail prices paid by the consumer for a specified basket of goods and services.
(a) Statement 1 is true and statement 2 is false.
(b) Statement 1 is false and statement 2 is true.
(c) Both statements 1 and 2 are true
(d) Both statements 1 and 2 are false

निम्नलिखित कथनों को ध्यानपूर्वक पढ़ें और निम्नलिखित में से सही विकल्प चुनें।
कथन 1: सूचकांक संख्या विभिन्न समय अवधि में संबंधित चर के समूह में पूर्ण परिवर्तन को मापने के लिए एक सांख्यिकीय उपकरण है।
कथन 2: उपभोक्ता मूल्य सूचकांक वस्तुओं और सेवाओं की एक निर्दिष्ट टोकरी के लिए उपभोक्ता द्वारा भुगतान की गई खुदरा कीमतों में औसत परिवर्तन को मापता है।
(ए) कथन 1 सत्य है और कथन 2 असत्य है।
(बी) कथन 1 असत्य है और कथन 2 सत्य है।
(सी) कथन 1 और 2 दोनों सत्य हैं
(डी) कथन 1 और 2 दोनों असत्य हैं

8 Identify the degree of correlation of the given diagram 1
दिए गए आरेख के सहसंबंध की डिग्री की पहचान करें



a) Perfectly positive correlation b) Positive correlation
c) Perfectly negative correlation d) negative correlation

a) पूर्णतः सकारात्मक सहसंबंध b) सकारात्मक सहसंबंध
c) पूर्णतः नकारात्मक सहसंबंध d) नकारात्मक सहसंबंध

9 Read the following statements – Assertion (A) and Reason (R). Choose one of the correct alternatives given below: 1
Assertion (A): Median is called a 'positional average'.
Reason(R)- Median does not take in to account the values of all items in a series.
(a) Both Assertion(A) and Reason (R) are true and Reason(R) is the correct explanation of Assertion (A).
(b) Both Assertion(A) and Reason (R)are true and Reason(R)is not the correct explanation of Assertion(A)
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A)is false but Reason (R)is true.

निम्नलिखित कथनों को पढ़ें - अभिकथन (A) और कारण (R)। नीचे दिए गए सही विकल्पों में से एक चुनें।
अभिकथन (A): माध्यिका को 'स्थितिगत औसत' कहा जाता है।
कारण (R) - माध्यिका किसी श्रृंखला में सभी वस्तुओं के मूल्यों को ध्यान में नहीं रखती है।
(a) अभिकथन (A) और कारण (R) दोनों सत्य हैं और कारण (R) अभिकथन (A) की सही व्याख्या है।
(b) अभिकथन (A) और कारण (R) दोनों सत्य हैं और कारण (R) अभिकथन (A) की सही व्याख्या नहीं है।
(c) अभिकथन (A) सत्य है लेकिन कारण (R) असत्य है।
(d) अभिकथन (A) असत्य है लेकिन कारण (R) सत्य है।

10 Which of the following value occurs most frequently in the series? 1
a. Median
b. Mean
c. Quartile
d. Mode

निम्नलिखित में से कौन सा मान श्रृंखला में सबसे अधिक बार आता है?
a. माध्यिका
b. माध्य
c. चतुर्थक
d. बहुलक

11 What is base year? What are the desirable properties of the base period? 3
OR
What is Consumer Price Index? What are its uses?

आधार वर्ष क्या है? आधार अवधि के वांछनीय गुण क्या हैं?
या
उपभोक्ता मूल्य सूचकांक क्या है? इसके क्या उपयोग हैं?

12 Direction: Observe the data given below and answer following questions(12a,12b&12c) onn the basis of the same. 3
In the first fortnight of August, tree plantation programme was organised in a school. After one-week height of planted trees was measured and tabulated as under:
निर्देश: नीचे दिए गए आँकड़ों का अवलोकन करें और उसके आधार पर निम्नलिखित प्रश्नों (12a,12b&12c) के उत्तर दें।

अगस्त के पहले पखवाड़े में, एक स्कूल में वृक्षारोपण कार्यक्रम आयोजित किया गया था, जिसके एक सप्ताह बाद लगाए गए पेड़ों की ऊँचाई मापी गई और निम्नानुसार सारणीबद्ध की गई:

Height of plants (in cm)	10-30	30-50	50-70	70-90	90-110
Number of plants	20	15	25	30	10

12a Midpoint of class 70-90 is:
वर्ग 70-90 का मध्यबिंदु है:
(a) 70 (b) 75 (c) 80 (d) 90

12b Total number of plants above 50 cm in height:
50 सेमी से अधिक ऊंचाई वाले पौधों की कुल संख्या:
(a) 40 (b) 30 (c) 55 (d) 65

12c Total number of plants with height less than 70 cm:
70 सेमी से कम ऊंचाई वाले पौधों की कुल संख्या:
(a) 60 (b) 40 (c) 35 (d) 25

13 Draw a pie chart with the help of the following data 4
निम्नलिखित डेटा की सहायता से पाई चार्ट बनाएं

ITEMS	EXPENDITURE (in Rs.)
Food	87
Clothing	24
Recreation	11
Education	13
Rent	25
Miscellaneous	20

Or

In XI th class, there are 140students, out of which 80 are boys. Out of total 80 boys, 40 boys belong to science stream and 25 belong to arts stream. There are 10 girls in science stream and 45 in commerce stream. Prepare a suitable Table.
ग्यारहवीं कक्षा में 140 विद्यार्थी हैं, जिनमें से 80 लड़के हैं। कुल 80 लड़कों में से 40 लड़के विज्ञान स्ट्रीम से हैं और 25 कला स्ट्रीम से हैं। विज्ञान स्ट्रीम में 10 लड़कियाँ और वाणिज्य स्ट्रीम में 45 लड़कियाँ हैं। एक उपयुक्त तालिका तैयार करें।

14 Calculate the Arithmetic mean from the following series 4
निम्नलिखित श्रृंखला से अंकगणितीय माध्य की गणना करें

Marks	5-15	15-25	25-35	35-45	45-55
No. of students	7	13	14	10	6

15 Following marks were obtained by 25 students of a class in mathematics paper. 4
19,13,12,25,32,12,31,19,21,23,27,41,29,30,45,39,33,40,17,11,20,26,14,41,15.
(i) Construct a frequency table with class intervals are inclusive, taking the lowest class as 10-19
(ii) Find number of students securing marks (a) more than 30 (b) less than 29.

गणित के पेपर में एक कक्षा के 25 छात्रों द्वारा निम्नलिखित अंक प्राप्त किए गए।
19,13,12,25,32,12,31,19,21,23,27,41,29,30,45,39,33,40,17,11,20,26,14,41,15.
(i) निम्नतम वर्ग को 10-19 मानते हुए वर्ग अंतरालों को सम्मिलित करते हुए एक बारंबारता सारणी बनाइए
(ii) अंक प्राप्त करने वाले छात्रों की संख्या ज्ञात कीजिए (a) 30 से अधिक (b) 29 से कम।

16 a. Explain the types of correlation (on the basis of direction of change) briefly. 6

b. Calculate the Spearman's rank correlation between the marks in Economics and Mathematics:

क. सहसंबंध के प्रकारों (परिवर्तन की दिशा के आधार पर) को संक्षेप में समझाएँ।

ख. अर्थशास्त्र और गणित में अंकों के बीच स्पीयरमैन रैंक सहसंबंध की गणना करें:

Marks in Economics	25	14	30	38	20	15	26	28
Marks in Mathematics	18	14	10	12	11	15	20	13

OR

What is correlation? Differentiate between Positive and Negative correlation. Also find the correlation of the following as positive or negative.

Price of a commodity and its quantity supplied.

Number of strikes and factory's production.

सहसंबंध क्या है? सकारात्मक और नकारात्मक सहसंबंध के बीच अंतर करें। इसके अलावा, निम्नलिखित का सकारात्मक या नकारात्मक सहसंबंध ज्ञात करें।

किसी वस्तु की कीमत और उसकी आपूर्ति की गई मात्रा।

(ii) हड़तालों की संख्या और कारखाने का उत्पादन।

17 Locate median graphically for the following data and verify it. 6

निम्नलिखित आँकड़ों के लिए माध्यिका को ग्राफ़िक रूप से ज्ञात कीजिए और इसकी पुष्टि कीजिए।

Marks	0-10	10-20	20-30	30-40	40-50	50-60	
No of students	6	7	8	10	16	3	

SECTION B- MICRO ECONOMICS

18 A fall in income of the consumer (in case of normal goods) will cause: 1

(a) upward movement on the demand curve

(b) downward movement on the demand curve

(c) rightward shift of the demand curve

(d) leftward shift of the demand curve

उपभोक्ता की आय में गिरावट (सामान्य वस्तुओं के मामले में) के कारण होगा:

(a) मांग वक्र पर ऊपर की ओर गति

(b) मांग वक्र पर नीचे की ओर गति

(c) मांग वक्र का दाईं ओर खिसकना

(d) मांग वक्र का बाईं ओर खिसकना

19 In the following question, a statement of assertion is followed by a statement of reason. Choose the correct answer out of the following choices. 1

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)

(c) Assertion (A) is true but Reason (R) is false

(d) Assertion (A) is false but Reason (R) is true

Assertion (A): Production Possibility Curve is also known as Indifference Curve.

Reason (R): Slope of production possibility curve is marginal rate of transformation.

निम्नलिखित प्रश्न में, एक कथन के बाद एक कारण का कथन दिया गया है। निम्नलिखित विकल्पों में से सही उत्तर चुनें।

(a) कथन (A) और कारण (R) दोनों सत्य हैं और कारण (R) कथन (A) की सही व्याख्या है।
(b) कथन (A) और कारण (R) दोनों सत्य हैं और कारण (R) कथन (A) की सही व्याख्या नहीं है।
(c) कथन (A) सत्य है लेकिन कारण (R) असत्य है।
(d) कथन (A) असत्य है लेकिन कारण (R) सत्य है।
कथन (A): उत्पादन संभावना वक्र को उदासीनता वक्र के रूप में भी जाना जाता है।
कारण (R): उत्पादन संभावना वक्र का ढलान परिवर्तन की सीमांत दर है।

20 A consumer is consuming two goods X and Y and is in equilibrium. The prices of X and Y are Rs.10 and Rs.20 respectively and Marginal Utility of Good Y is 50utils. What will be the Marginal Utility of Good X? (Choose the correct alternative) 1

(a) 100 utils
(b) 25 utils
(c) 250 utils
(d) 15 utils

एक उपभोक्ता दो वस्तुओं X और Y का उपभोग कर रहा है और संतुलन में है। X और Y की कीमतें क्रमशः 10 रुपये और 20 रुपये हैं और वस्तु Y की सीमांत उपयोगिता 50 यूटिल है। वस्तु X की सीमांत उपयोगिता क्या होगी? (सही विकल्प चुनें)

(a) 100 यूटिल
(b) 25 यूटिल
(c) 250 यूटिल
(d) 15 यूटिल

21 A shift in budget line, when prices are constant, is due to: 1

(a) change in demand (b) change in income
(c) change in preferences (d) change in utility

जब कीमतें स्थिर होती हैं, तो बजट रेखा में बदलाव निम्नलिखित कारणों से होता है:

(a) मांग में परिवर्तन (b) आय में परिवर्तन
(c) वरीयताओं में परिवर्तन (d) उपयोगिता में परिवर्तन

22 Read the following statements carefully: 1

Statement 1: The gap between AC and AVC keeps on decreasing with rise in output.
Statement 2: For necessary good price elasticity will be more than unitary elastic
In the light of the given statements, choose the correct alternative

a) Both the statements are true
b) Both the statements are false
c) Statement 1 is true and statement 2 is false
d) Statement 2 is true and statement 1 is false

or

The total cost of producing 8 units of output is 75 rupees. If average total cost of producing 9 units is 10 rupees, then what will be the marginal cost of this level of output?
(a) 25 (b) 90 (c) 15 (d) 80

निम्नलिखित कथनों को ध्यानपूर्वक पढ़ें:
कथन 1: उत्पादन में वृद्धि के साथ AC और AVC के बीच का अंतर कम होता रहता है।
कथन 2: आवश्यक वस्तु के लिए मूल्य लोच इकाई लोच से अधिक होगी
दिए गए कथनों के प्रकाश में, सही विकल्प चुनें

a) दोनों कथन सत्य हैं
b) दोनों कथन असत्य हैं
c) कथन 1 सत्य है और कथन 2 असत्य है

d) कथन 2 सत्य है और कथन 1 असत्य है

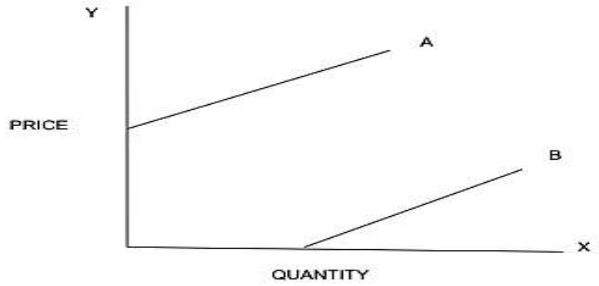
या

उत्पादन की 8 इकाइयों के उत्पादन की कुल लागत 75 रुपये है। यदि 9 इकाइयों के उत्पादन की औसत कुल लागत 10 रुपये है, तो उत्पादन के इस स्तर की सीमांत लागत क्या होगी?

(a) 25 (b) 90 (c) 15 (d) 80

23 Identify the Elasticity of supply of curve A and B from the following diagram: 1

निम्नलिखित आरेख से वक्र A और B की आपूर्ति की लोच की पहचान करें:



A(Es > 1), B (Es < 1)
A (Es < 1), B (Es > 1)
A (Es > 1), B (Es > 1)
A (Es < 1), B (Es < 1)

24 An increase in the price of electricity will cause the demand for electric appliances to: 1

Rise (b) fall (c) constant (d) none of the above

बिजली की कीमत में वृद्धि से विद्युत उपकरणों की मांग में वृद्धि होगी:

a) वृद्धि (b) गिरावट (c) स्थिर (d) उपरोक्त में से कोई नहीं

25 Read the following statement given below and choose the correct alternative. 1

Statement 1- When price is constant, the revenue from every additional unit is equal to average revenue.

Statement 2- AR=MR, when price is constant.

(a) Both are correct
(b) Both are incorrect
(c) Statement 1 is correct and statement 2 is incorrect
(d) Statement 1 is incorrect and statement 2 is correct

नीचे दिए गए कथन को पढ़ें और सही विकल्प चुनें।

कथन 1- जब कीमत स्थिर होती है, तो प्रत्येक अतिरिक्त इकाई से प्राप्त राजस्व औसत राजस्व के बराबर होता है। कथन 2- जब कीमत स्थिर होती है तो AR=MR होता है।

(a) दोनों सही हैं
(b) दोनों गलत हैं
(c) कथन 1 सही है और कथन 2 गलत है
(d) कथन 1 गलत है और कथन 2 सही है

26 Which of the following is an example of a fixed cost? 1

The wages and salaries of employees
The interest on fixed capital
The electricity bills

None of the above

निम्नलिखित में से कौन सा स्थिर लागत का उदाहरण है?
(a) कर्मचारियों की मजदूरी और वेतन
(b) स्थिर पूंजी पर ब्याज
(c) बिजली बिल
(d) उपरोक्त में से कोई नहीं

27 Read the statements carefully and choose the correct alternative among those given below: 1
Statement 1: Price ceiling is generally imposed on essential items and is fixed below the market determined price
Statement 2: Price Ceiling is also known as Minimum Price Ceiling
Alternatives:
(a) Both the statements are True
(b) Both the statements are False
(c) Statement 1 is True and Statement 2 is False
(d) Statement 2 is True and Statement 1 is False

कथनों को ध्यान से पढ़ें और नीचे दिए गए विकल्पों में से सही विकल्प चुनें:
कथन 1: मूल्य सीमा आम तौर पर आवश्यक वस्तुओं पर लगाई जाती है और बाजार द्वारा निर्धारित मूल्य से नीचे तय की जाती है
कथन 2: मूल्य सीमा को न्यूनतम मूल्य सीमा के रूप में भी जाना जाता है
विकल्प:
(a) दोनों कथन सत्य हैं
(b) दोनों कथन असत्य हैं
(c) कथन 1 सत्य है और कथन 2 असत्य है
(d) कथन 2 सत्य है और कथन 1 असत्य है

28 "An economy always produces on, but not inside, a PPC'. Defend or refute the statement. 3

Or

"Scarcity and choice problem go together" Do you agree with this statement? Give reason in support your answer?

"एक अर्थव्यवस्था हमेशा PPC पर उत्पादन करती है, लेकिन उसके अंदर नहीं। इस कथन का बचाव करें या खंडन करें।

या

"कमी और विकल्प की समस्या एक साथ चलती है" क्या आप इस कथन से सहमत हैं? अपने उत्तर के समर्थन में कारण बताएँ

29 Explain the implications of the following features of perfect competition. 3
(i) Homogeneous products
(ii) Freedom of entry and exit to firms

पूर्ण प्रतिस्पर्धा की निम्नलिखित विशेषताओं के निहितार्थों की व्याख्या करें।
(i) समरूप उत्पाद
(ii) फर्मों को प्रवेश और निकास की स्वतंत्रता

30 A consumer has total money income of 250 to be spent on two goods X and Y with prices of 25 and 10 per unit respectively. Based on the information given, answer the following questions: 4
a. Give the equation of the budget line for the consumer.
b. What is the value of slope of the budget line?
c. How many units can the consumer buy if he is to spend all his money income on good X?

e. How does the budget line change if there is a fall in price of good Y?

or

a) What do you mean by Elasticity of Demand?

b) The market demand for a good at ₹ 4 per unit is 100 units. Due to increase in price, the market demand falls to 75 units. Find out the new price, elasticity of demand is (-)1?

एक उपभोक्ता के पास 250 की कुल धन आय है जिसे दो वस्तुओं X और Y पर खर्च करना है जिनकी कीमत क्रमशः 25 और 10 प्रति इकाई है। दी गई जानकारी के आधार पर, निम्नलिखित प्रश्नों के उत्तर दें:

a. उपभोक्ता के लिए बजट रेखा का समीकरण दें।

b. बजट रेखा के ढलान का मान क्या है?

c. यदि उपभोक्ता को अपनी सारी धन आय वस्तु X पर खर्च करनी है तो वह कितनी इकाइयाँ खरीद सकता है?

e. यदि वस्तु Y की कीमत में गिरावट होती है तो बजट रेखा कैसे बदलती है?

या

a) मांग की लोच से आप क्या समझते हैं?

b) ₹ 4 प्रति यूनिट पर एक वस्तु की बाजार मांग 100 यूनिट है। कीमत बढ़ने से बाजार में मांग घटकर 75 यूनिट रह गई है. नई कीमत ज्ञात कीजिए, मांग की लोच (-)1 है?

31 From the following table find out the level of output at which the producer will be equilibrium (use MR-MC approach). Give reason for your answer. 4

निम्नलिखित तालिका से उत्पादन का वह स्तर ज्ञात कीजिए जिस पर उत्पादक संतुलन में होगा। (एमआर-एमसी दृष्टिकोण का प्रयोग करें)। अपने उत्तर के लिए कारण दीजिए।

OUTPUT	AR (Rs)	AC (Rs)
1	12	4
2	11	5
3	10	6
4	9	7
5	8	8

32 The market for a good is in equilibrium. How would an increase in an input price affect the equilibrium price and equilibrium quantity, keeping other factors constant? Explain using a diagram. 4

किसी वस्तु के लिए बाज़ार संतुलन में है। इनपुट मूल्य में वृद्धि अन्य कारकों को स्थिर रखते हुए संतुलन मूल्य और संतुलन मात्रा को कैसे प्रभावित करेगी? एक आरेख का उपयोग करके समझाएँ

33 State giving reason whether the following statements are true or false: 6

(a) Lower indifference curve represents higher level of satisfaction.

(b) At the point of consumer's equilibrium Marginal Rate of Substitution (MRS) should be equal to the Ratio of prices of two goods X and Y (Px/Py).

(c)A budget set is a collection of such bundles of goods that give same level of satisfaction.

कारण सहित बताइए कि निम्नलिखित कथन सत्य हैं या असत्य:

(क) निम्न उदासीनता वक्र उच्च संतुष्टि स्तर को दर्शाता है।

(ख) उपभोक्ता के संतुलन बिंदु पर प्रतिस्थापन की सीमांत दर (एमआरएस) दो वस्तुओं एक्स और वाई (पीएक्स/पीवाई) की कीमतों के अनुपात के बराबर होनी चाहिए।

(ग) बजट सेट वस्तुओं के ऐसे बंडलों का संग्रह है जो संतुष्टि का समान स्तर देते हैं।

34 State the different phases of law of returns to a factor in terms of behaviour of Marginal Product (MP). Represent the same in the diagram. 6

(or)

Explain the effect of technological changes on the supply of a commodity?

Explain the law of supply with the help of a supply schedule?

सीमांत उत्पाद (MP) के व्यवहार के संदर्भ में किसी कारक पर प्रतिफल के नियम के विभिन्न चरणों को बताएँ। इसे आरेख में दर्शाएँ।

(या)

a. किसी वस्तु की आपूर्ति पर तकनीकी परिवर्तनों के प्रभाव की व्याख्या करें?
b. आपूर्ति अनुसूची की सहायता से आपूर्ति के नियम की व्याख्या करें?

UNSOLVED SAMPLE QUESTION PAPERS

SAMPLE QUESTION PAPER-2

General Instructions:
All questions in both the sections are compulsory.
Marks for questions are indicated against each.
Question numbers 1-10 and 18-27 are very short-answer questions carrying 1 mark each.
Question numbers 11-12 and 28-29 are short answer questions carrying 3 marks each.
Answers to them should normally not exceed 60 words each.
Question numbers 13-15 and 30-32 are also short answer questions carrying 4 marks each. Answers to them should not normally exceed 70 words each.
Question numbers 16-17 and 33-34 are long answer questions carrying 6 marks each. Answers to them should not exceed 100 words each.
सामान्य निर्देश:
i) दोनों अनुभागों में सभी प्रश्न अनिवार्य हैं।
ii) प्रत्येक प्रश्न के सामने अंक दर्शाए गए हैं।
iii) प्रश्न संख्या 1-10 और 18-27 अति लघु उत्तरीय प्रश्न हैं, प्रत्येक प्रश्न 1 अंक का है।
iv) प्रश्न संख्या 11-12 और 28-29 लघु उत्तरीय प्रश्न हैं जिनमें से प्रत्येक के लिए 3 अंक हैं। इनके उत्तर सामान्यतः 60 शब्दों से अधिक नहीं होने चाहिए।
v) प्रश्न संख्या 13-15 और 30-32 भी लघु उत्तरीय प्रश्न हैं जिनमें से प्रत्येक के लिए 4 अंक हैं। इनके उत्तर सामान्यतः 70 शब्दों से अधिक नहीं होने चाहिए।
vi) प्रश्न संख्या 16-17 और 33-34 दीर्घ उत्तरीय प्रश्न हैं जिनमें से प्रत्येक 6 अंक का है। प्रत्येक का उत्तर 100 शब्दों से अधिक नहीं होना चाहिए।

SECTION A (STATISTICS)

1.In plural sense, which of the following is not a characteristic of Statistics? (1)
a) Aggregate of data
b) affected multiplicity of causes
c) only expressed in words
d) collected in a systematic manner

. बहुवचन अर्थ में निम्नलिखित में से कौन सांख्यिकी की विशेषता नहीं है?

ए) डेटा का समुच्चय
बी) कारणों की बहुलता से प्रभावित
सी) केवल शब्दों में व्यक्त किया गया
डी) व्यवस्थित तरीके से एकत्र किया गया

2.Which of the following statement is incorrect? (1)
Resources have alternative uses
All numbers are Statistics
Statistics studies only the aggregates of quantitative facts
Macroeconomics studies aggregates.
निम्नलिखित में से कौन सा कथन गलत है?
क) संसाधनों के वैकल्पिक उपयोग होते हैं
b) सभी संख्याएँ सांख्यिकी हैं
सी) सांख्यिकी केवल मात्रात्मक तथ्यों के समुच्चय का अध्ययन करती है
डी) समष्टि अर्थशास्त्र समुच्चय का अध्ययन करता है।

3. Which of the following is an economic activity? (1)
a) Production b) consumption
c) distribution d) All of these
निम्नलिखित में से कौन सी एक आर्थिक गतिविधि है?
ए) उत्पादन बी) खपत
सी) वितरण डी) ये सभी

4. Read the following statements carefully and choose the correct alternative from the following: (1)
Statement 1 – Primary data are original and secondary data are already in existence and therefore, are not original.
Statement 2 – Primary data need adjustment to suit the objective of study in hand. Alternatives:
a) Both the statements are true.
b) Both the statements are false.
c) Statement 1 is true and Statement 2 is false
d)Statement 2 is true and Statement 1 is false
निम्नलिखित कथनों को ध्यानपूर्वक पढ़ें और इनमें से सही विकल्प चुनें:
कथन 1 - प्राथमिक डेटा मूल हैं और द्वितीयक डेटा पहले से ही अस्तित्व में हैं और इसलिए, मूल नहीं हैं।
कथन 2 - प्राथमिक डेटा को अध्ययन के उद्देश्य के अनुरूप समायोजन की आवश्यकता है। विकल्प:
ए) दोनों कथन सत्य हैं।
बी) दोनों कथन गलत हैं।
सी) कथन 1 सत्य है और कथन 2 गलत है
डी) कथन 2 सत्य है और कथन 1 गलत है।

5.Which of the following method is used for the estimation of population in a country? (1)
a) sampling method b) Both a) and (b)
c) census method (d) None of these
किसी देश में जनसंख्या के आकलन के लिए निम्नलिखित में से किस विधि का उपयोग किया जाता है?
ए) नमूनाकरण विधि बी) दोनों ए) और (बी)
सी) जनगणना विधि डी) इनमें से कोई नहीं

6.Pilot survey is conducted to assess (1)
Quality and suitability of questions

Performance of enumerators
Cost and time involved in the final survey
All of these

आकलन के लिए पायलट सर्वे कराया जाता है
ए) प्रश्नों की गुणवत्ता और उपयुक्तता
बी) प्रगणकों का प्रदर्शन
सी) अंतिम सर्वेक्षण में शामिल लागत और समय
डी) ये सभी

7.Which of the following refer to geometric form of data presentation? (1)
Bar diagram b) pie diagram
c) histogram d) Both a) and c)

निम्नलिखित में से कौन डेटा प्रस्तुति के ज्यामितीय रूप को संदर्भित करता है?
ए) बार आरेख बी) पाई आरेख
सी) हिस्टोग्राम डी) दोनों ए) और सी)

8.Arithmetic mean of thee items: 10, 15, X, 20,30 is 20. Find out the missing (1)
item.
5 b) 15
c)10 d) 25

आपके आइटमों का अंकगणितीय माध्य: 10, 15, X, 20,30 20 है। लुप्त का पता लगाएं
ए) 5 बी) 15
सी)10 डी) 25

9.When two variables change in a constant proportion, t is called: (1)
Linear correlation b) non-linear correlation
c) Partial correlation d) none of these

जब दो चर एक स्थिर अनुपात में बदलते हैं, तो t कहा जाता है:
ए) रैखिक सहसंबंध बी) गैर-रैखिक सहसंबंध
सी) आंशिक सहसंबंध डी) इनमें से कोई नहीं

10. Mode refers to that value of a series that occurs _____ times in a series. (1)
Zero b) infinite
c) Minimum d) maximum

मोड किसी श्रृंखला के उस मान को संदर्भित करता है जो एक श्रृंखला में _____ बार आता है।
ए) शून्य बी) अनंत
सी) न्यूनतम डी) अधिकतम

11. Define mode and discuss the merits of mode. (3)
मोड को परिभाषित करें और मोड के गुणों पर चर्चा करें।

12. Calculate the median from the following data set: 10, 15, 20, 25, 30. (3)
निम्नलिखित डेटा सेट से माध्यिका की गणना करें: 10, 15, 20, 25, 30।

13. "A good sample is based on correctness and continuity." In the context of (4)
the above statement, explain characteristics of good sample.
"एक अच्छा नमूना शुद्धता और निरंतरता पर आधारित होता है।" उपरोक्त कथन के संदर्भ में, अच्छे नमूने की विशेषताओं की व्याख्या करें।

14. What precautions must be taken while preparing a questionnaire? (4)

Or

Net domestic product by industry of origin is given below. Present the data in the form of a pie diagram.

Sector	%share
Primary	16.2
Secondary	25.4
Transport	27.5
Finance and insurance	18.1
Social services	12.8
Total	100

प्रश्नावली तैयार करते समय क्या सावधानियाँ बरतनी चाहिए?

या

मूल उद्योग द्वारा शुद्ध घरेलू उत्पाद नीचे दिया गया है। डेटा प्रस्तुत करें पाई आरेख के रूप में।

सेक्टर	%शेयर
प्राथमिक	16.2
माध्यमिक	25.4
परिवहन	27.5
वित्त और बीमा	18.1
सामाजिक सेवाएँ	12.8
कुल	100

15. Calculate coefficient of correlation for the ages of husband and wife. (4)

Age of husband	24	25	22	30	34	37
Age of wife	20	21	18	26	28	30

पति की उम्र	24	25	22	30	34	37
पत्नी की उम्र	20	21	18	26	28	30

पति और पत्नी की आयु के लिए सहसंबंध गुणांक की गणना करे

16. Describe the uses of index number. What considerations are to taken into account while selecting the base year for the preparation of an index number? (6)

OR

What do you mean by index numbers? Describe briefly the problems involved in the Construction of index number of prices.

सूचकांक संख्या के उपयोग बताइये। किन बातों का ध्यान रखना है

सूचकांक संख्या तैयार करने के लिए आधार वर्ष का चयन करते समय क्या ध्यान रखना चाहिए?

या

सूचकांक संख्याओं से आप क्या समझते हैं? इसमें शामिल समस्याओं का संक्षेप में वर्णन करें कीमतों की सूचकांक संख्या के निर्माण में।

17. Define correlation and properties of correlation coefficient. (6)

सहसंबंध और सहसंबंध गुणांक के गुणों को परिभाषित करें।

SECTION B (MICROECONOMICS)

18. Read the following statements- Assertion (A) and Reason (R). Choose one of the Correct alternatives given below: (1)

Assertion(A): Consumer demand will change only if price of the product changes.
Reason (R): Consumers are more sensitive towards price change.

Alternatives: -
Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)
Assertion (A) is true but Reason (R) is false.
Assertion (A) is false but Reason (R) is true

निम्नलिखित कथन पढ़ें- दावा (ए) और कारण (आर)। नीचे दिए गए सही विकल्पों में से एक चुनें
दावा (ए): उपभोक्ता मांग तभी बदलेगी जब उत्पाद की कीमत बदलेगी।
कारण (आर): उपभोक्ता मूल्य परिवर्तन के प्रति अधिक संवेदनशील हैं।

विकल्प: -
ए) दावा (ए) और कारण (आर) दोनों सत्य हैं और कारण (आर) दावे (ए) का सही स्पष्टीकरण है
बी) दावा (ए) और कारण (आर) दोनों सत्य हैं और कारण (आर) दावे (ए) का सही स्पष्टीकरण नहीं है
सी) दावा (ए) सत्य है लेकिन कारण (आर) गलत है।
डी) दावा (ए) गलत है लेकिन कारण (आर) सच है।

19. A shift in budget line, when prices are constant, is due to: (1)
a) change in demand b) change in preference
c)change in utility d) change in income

जब कीमतें स्थिर रहती हैं, तो बजट रेखा में बदलाव किसके कारण होता है:
ए) मांग में बदलाव बी) प्राथमिकता में बदलाव
सी) उपयोगिता में परिवर्तन डी) आय में परिवर्तन

20. Demand for which type of good falls with rise in income? (1)
a) Inferior good b) Substitute good
c) Complementary good d) Normal goods

किस प्रकार की वस्तु की मांग आय में वृद्धि के साथ घटती है?
ए) निम्न अच्छा बी) स्थानापन्न अच्छा
सी) पूरक वस्तु डी) सामान्य वस्तु

21. How will a fall in price of tea affect the quantity supplied of coffee? (1)
a) Quantity supplied will decrease b) Quantity supplied will increase
c) No change in Quantity supplied of Coffee d) None of these

चाय की कीमत में गिरावट से कॉफी की आपूर्ति की मात्रा पर क्या प्रभाव पड़ेगा?
a) आपूर्ति की मात्रा घट जाएगी b) आपूर्ति की मात्रा बढ़ जाएगी
सी) कॉफी की आपूर्ति की मात्रा में कोई बदलाव नहीं डी) इनमें से कोई नहीं

22. A firm under perfect competition is ____. (1)
a) Price taker b) Price maker
c) Price influencer d) All of the above

पूर्ण प्रतियोगिता के अंतर्गत एक फर्म है
ए) कीमत लेने वाला बी) कीमत बनाने वाला

सी) कीमत प्रभावित करने वाला डी) उपरोक्त सभी

23. The shape of Average Cost Curve is due to the behaviour of: (1)
(a) Law of Marginal Rate of Substitution (b) Law of variable proportion
(c) Law of constant returns to factor (d) None of these
औसत लागत वक्र का आकार किसके व्यवहार के कारण होता है:
ए) प्रतिस्थापन की सीमांत दर का कानून बी) परिवर्तनीय अनुपात का कानून
सी) कारक पर निरंतर रिटर्न का कानून डी) इनमें से कोई नहीं

24. Subsidy on the production of a commodity causes: (1)
a) increase in supply b) decrease in supply
c) no change in supply d) both a) and b)

किसी वस्तु के उत्पादन पर सब्सिडी का कारण बनता है:
ए) आपूर्ति में वृद्धि b) आपूर्ति में कमी
सी) आपूर्ति में कोई बदलाव नहीं डी) दोनों ए) और बी)

25. Read the following statements- Assertion (A) and Reason (R). Choose one of the (1)
Correct alternatives given below:
Assertion (A): Total product increases at increasing rate only when marginal product increases.
Reason (R): TP falls or rises so long as MP is Rising or falling
Alternatives: -
a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)
b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)
c)Assertion (A) is true but Reason (R) is false.
d) Assertion (A) is false but Reason (R) is true.

निम्नलिखित कथन पढ़ें- दावा (ए) और कारण (आर)। नीचे दिए गए सही विकल्पों में से एक चुनें:
अभिकथन (ए): कुल उत्पाद तभी बढ़ती दर से बढ़ता है जब सीमांत उत्पाद बढ़ता है।
कारण (आर): टीपी तब तक गिरता या बढ़ता है जब तक एमपी बढ़ रहा है या गिर रहा है
विकल्प: -
ए) दावा (ए) और कारण (आर) दोनों सत्य हैं और कारण (आर) दावे (ए) का सही स्पष्टीकरण है
बी) दावा (ए) और कारण (आर) दोनों सत्य हैं और कारण (आर) दावे (ए) का सही स्पष्टीकरण नहीं है
सी) दावा (ए) सत्य है लेकिन कारण (आर) गलत है।
डी) दावा (ए) गलत है लेकिन कारण (आर) सच है।

26. Average Revenue: (1)
a) can be negative b) cannot be negative
c) is zero when TR is zero d) both b) and c)
औसत आमदनी:
ए) नकारात्मक हो सकता है बी) नकारात्मक नहीं हो सकता
सी) शून्य है जब टीआर शून्य है डी) दोनों बी) और सी)

27. Supply curve shifts forward due to: (1)
a) decrease in factor price b) increase of firms in the market
c) high business expectations d) all of these
आपूर्ति वक्र किसके कारण आगे बढ़ता है:
ए) कारक मूल्य में कमी बी) बाजार में फर्मों की वृद्धि
सी) उच्च व्यावसायिक उम्मीदें डी) ये सभी

28. Why is the demand curve facing a firm under perfect competition perfectly elastic? (3)
पूर्ण प्रतिस्पर्धा के तहत किसी फर्म का मांग वक्र पूर्णतया लोचदार क्यों होता है?

29. Explain the relation between Average Cost and Marginal Cost. (3)

OR

Why does the Average Fixed Cost curve never touch the "x" axis though it lies very close to the x-axis?

औसत लागत और सीमांत लागत के बीच संबंध स्पष्ट करें।

या

औसत निश्चित लागत वक्र कभी भी "x" अक्ष को क्यों नहीं छूता है, हालांकि यह बहुत झूठ बोलता है x-अक्ष के निकट?

30. Market economies promote disparities in income distribution even when resources are optimally utilized. Substantiate this statement. (4)

OR

Explain what to produce as an economic problem.

संसाधनों का इष्टतम उपयोग होने पर भी बाजार अर्थव्यवस्थाएं आय वितरण में असमानताओं को बढ़ावा देती हैं। इस कथन की पुष्टि करें।

या

बताएं कि आर्थिक समस्या के रूप में क्या उत्पादन करना है।

31. Why does demand curve of a normal good slope downward from left to right. (4)

सामान्य अच्छे मांग वक्र का ढलान बाएं से दाएं नीचे की ओर क्यों होता है?

32. Explain the law of diminishing marginal utility. How does it affect consumer behaviour? (4)

ह्रासमान सीमांत उपयोगिता का नियम समझाइये। यह उपभोक्ता व्यवहार को कैसे प्रभावित करता है?

33. Answer the following questions: (6)

a. What is the behaviour of Total Variable Cost as output increases?

b. Why is the TVC inverse shaped?

c. What is the behaviour of average fixed cost as output increases?

Or

Explain the different phases in the Law of Variable Proportion.

निम्नलिखित प्रश्नों के उत्तर दीजिए:

ए) उत्पादन बढ़ने पर कुल परिवर्तनीय लागत का व्यवहार क्या होता है?

बी) टीवीसी का आकार उल्टा क्यों होता है?

सी) उत्पादन बढ़ने पर औसत स्थिर लागत का व्यवहार क्या होता है?

या

परिवर्तनीय अनुपात के नियम के विभिन्न चरणों की व्याख्या करें।

34.Show consumer's equilibrium using indifference curve analysis with the help of diagram. Also analyze the conditions of consumer's equilibrium. (6)

चित्र की सहायता से उदासीनता वक्र विश्लेषण का उपयोग करके उपभोक्ता का संतुलन दिखाएँ। उपभोक्ता संतुलन की स्थितियों का भी विश्लेषण करें।

UNSOLVED SAMPLE QUESTION PAPERS

SAMPLE QUESTION PAPER-3

General Instructions

सामान्य निर्देश

This question paper contains two parts:
इस प्रश्न पत्र में दो भाग हैं:

*****Part A – STATISTICS FOR ECONOMICS (40 marks)
भाग ए - अर्थशास्त्र के लिए सांख्यिकी (40 अंक)

*Part B - INTRODUCTORY MICRO ECONOMICS (40 marks).
भाग बी - परिचयात्मक सूक्ष्म अर्थशास्त्र (40 अंक)

Marks for questions are indicated against each question.
प्रत्येक प्रश्न के सामने प्रश्नों के अंक अंकित हैं।

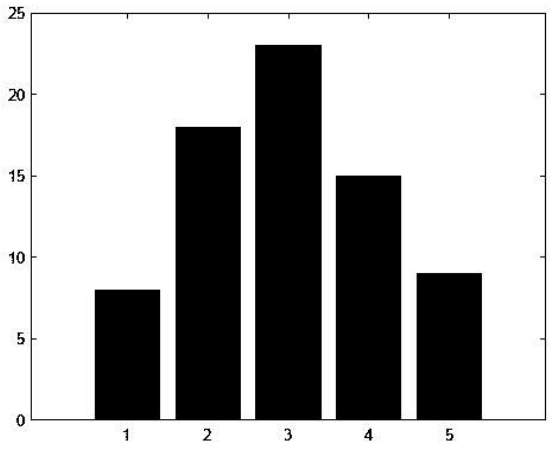
This paper contains 20 Multiple Choice Questions of 1 mark each
इस पेपर में 1 अंक के 20 बहुविकल्पीय प्रश्न हैं

This paper contains 4 Short Answer type questions of 3 marks each to be answered in 60 to 80 words.
इस पेपर में 3 अंकों के 4 लघु उत्तरीय प्रश्न हैं जिनका उत्तर 60 से 80 शब्दों में देना है।

This paper contains 6 Short Answer type questions of 4 marks each to be answered in 80 to 100 words.
इस पेपर में 4 अंकों के 6 लघु उत्तरीय प्रश्न हैं जिनका उत्तर 80 से 100 शब्दों में देना है।

This paper contains 4 Long Answer type questions of 6 marks each to be answered in 100 to 150 words
इस पेपर में 6 अंकों के 4 दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 100 से 150 शब्दों में देना होगा

Q.NO प्र.सं	**Questions** प्रश्न	**Marks**
	PART A- STATISTICS FOR ECONOMICS **भाग ए- अर्थशास्त्र के लिए सांख्यिकी**	
1	Data represented through a histogram can help in finding geographically the---------- Mean b. Mode c. Median d. All of these **OR** Bar diagram and pie diagram come in the category of --------- Geometric diagram b. Frequency diagram c. Arithmetic line graph d . None of these हिस्टोग्राम के माध्यम से प्रदर्शित डेटा भौगोलिक रूप से ---------- खोजने में मदद कर सकता है a. माध्य. b. बहुलक. c.माध्यिका. d.ये सभी **या** बार आरेख और पाई आरेख -------- की श्रेणी में आते हैं a. ज्यामितीय आरेख b. आवृत्ति आरेख c. अंकगणितीय रेखा ग्राफ d. इनमें से कोई नहीं	**1**
2	Pre –testing of the questionnaire is known as---------- a. Sample survey b. Random sampling. c.Pilot survey d. Non-random sampling प्रश्नावली के पूर्व-परीक्षण को इस नाम से जाना जाता है------	**1**

	क. नमूना सर्वेक्षण ख. यादृच्छिक नमूनाकरण ग. पायलट सर्वेक्षण घ. गैर यादृच्छिक नमूनाकरण	
3	Identify from the following, which is the incorrect pair Column A: 1. Median 2. Mean 3. Mode Column B: i. Positional average ii. Based on all observation iii. Ogives (b) Only first (b) Both first and third (c) Only third (d) None निम्नलिखित में से पहचानें कि गलत जोड़ी कौन सी है कॉलम A: 1. माध्यिका 2. माध्य 3. बहुलक कॉलम B: i. स्थितीय औसत ii. सभी प्रेक्षणों पर आधारित Iii तोरण (a) केवल पहला (b) पहला और तीसरा दोनों (c) केवल तीसरा (d) कोई नहीं	**1**
4	Identify which type of bar diagram is given here  a. Component b. Multiple c. percentage d. simple पहचान करें कि यहाँ किस प्रकार का बार आरेख दिया गया है क. घटक ख. गुणज ग. प्रतिशत घ. सरल	**1**
5	**Read the following statements carefully and choose the correct alternative from the following:**	**1**

	Statement 1: In case of perfect positive correlation, the degree of correlation lies between +0.75 and +1. **Statement 2**: When degree of correlation of two series is very small, it is called low degree of correlation a) Both the statements are true. b) Both the statements are false. c) Statement 1 is true and Statement 2 is false d) Statement 1 is false and Statement 2 is true निम्नलिखित कथनों को ध्यानपूर्वक पढ़ें और निम्नलिखित में से सही विकल्प चुनें: कथन 1: पूर्ण सकारात्मक सहसंबंध के मामले में, सहसंबंध की डिग्री +0.75 और +1 के बीच होती है। कथन 2: जब दो श्रृंखलाओं के सहसंबंध की डिग्री बहुत कम होती है, तो इसे सहसंबंध की कम डिग्री कहा जाता है। a) दोनों कथन सत्य हैं। b) दोनों कथन असत्य हैं। c) कथन 1 सत्य है और कथन 2 असत्य है d) कथन 1 असत्य है और कथन 2 सत्य है	
6	**Read the following statements carefully and choose the correct alternative from the following:** **Statement1: While** constructing index number, weights are accorded to different commodities according to their relative significance **Statement 2**: Index numbers help to ascertain the living standard of the people a) Both the statements are true. b) Both the statements are false. c) Statement 1 is true and Statement 2 is false d) Statement 1 is false and Statement 2 is true निम्नलिखित कथनों को ध्यानपूर्वक पढ़ें और निम्नलिखित में से सही विकल्प चुनें: कथन 1: सूचकांक बनाते समय, विभिन्न वस्तुओं को उनके सापेक्ष महत्व के अनुसार भार दिया जाता है कथन 2: सूचकांक लोगों के जीवन स्तर का पता लगाने में मदद करते हैं a) दोनों कथन सत्य हैं। b) दोनों कथन असत्य हैं। c) कथन 1 सत्य है और कथन 2 असत्य है d) कथन 1 असत्य है और कथन 2 सत्य है	**1**
7	The total marks scored by all the students of class XI B in a class test is 420 with an average of 15 marks. How many students are there in XI B class? a. 37 b. 27 c. 38 d. 28 कक्षा XI B के सभी छात्रों द्वारा एक कक्षा टेस्ट में प्राप्त कुल अंक 420 हैं, जिनका औसत 15 अंक है। कक्षा XI B में कितने छात्र हैं? a. 37 b. 27 c. 38 d. 28	**1**
8	Under random sampling, each item of the universe has---------- chance of being selected a. Equal b. unequal c. zero d. none of these यादृच्छिक प्रतिचयन के अंतर्गत, ब्रह्मांड की प्रत्येक वस्तु के चयनित होने की ---------- संभावना होती है	**1**

	a. बराबर b. असमान c. शून्य d. इनमें से कोई नहीं	
9	Read the following statements- Assertion (A) and Reason (R .- Choose one correct alternative given below **Assertion (A)**: Classification of data helps in simplifying and organising data for analysis **Reason (R):** Classification involves arranging data into different classes based on common characteristics Alternatives a)Both Assertion A and reason R are true and Reason R is the correct explanation of Assertion A b)Both Assertion A and reason R are true and Reason R is not the correct explanation of Assertion A c)Assertion A is true but Reason R is false d)Assertion A is false but Reason R is true निम्नलिखित कथनों को पढ़ें- अभिकथन (A) और कारण (R.- नीचे दिए गए एक सही विकल्प का चयन करें अभिकथन (A): डेटा का वर्गीकरण विश्लेषण के लिए डेटा को सरल और व्यवस्थित करने में मदद करता है कारण (R): वर्गीकरण में सामान्य विशेषताओं के आधार पर डेटा को विभिन्न वर्गों में व्यवस्थित करना शामिल है विकल्प a) अभिकथन A और कारण R दोनों सत्य हैं और कारण R, अभिकथन A की सही व्याख्या है b) अभिकथन A और कारण R दोनों सत्य हैं और कारण R, अभिकथन A की सही व्याख्या नहीं है c) अभिकथन A सत्य है लेकिन कारण R असत्य है d) अभिकथन A असत्य है लेकिन कारण R सत्य है	**1**
10	Read the following statements- Assertion (A) and Reason (R) Choose the correct alternative given below **Assertion (A)**: While calculating median of the series the terms need to be arranged in either ascending order or descending order **Reason (R):** In median a central item is to be found which divides the series into two equal parts Alternatives a. Both Assertion A and reason R are true and Reason R is the correct explanation of Assertion A b. Both Assertion A and reason R are true and Reason R is not the correct explanation of Assertion A c.Assertion A is true but Reason R is false d. Assertion A is false but Reason R is true निम्नलिखित कथनों को पढ़ें- अभिकथन (A) और कारण (R) नीचे दिए गए सही विकल्प का चयन करें अभिकथन (A): श्रृंखला की माध्यिका की गणना करते समय पदों को आरोही क्रम या अवरोही क्रम में व्यवस्थित करने की आवश्यकता होती है कारण (R): माध्यिका में एक केंद्रीय मद ढूंढ़ना होता है जो श्रृंखला को दो बराबर भागों में विभाजित करता है विकल्प	**1**

	a. अभिकथन A और कारण R दोनों सत्य हैं और कारण R, अभिकथन A की सही व्याख्या है b. अभिकथन A और कारण R दोनों सत्य हैं और कारण R, अभिकथन A की सही व्याख्या नहीं है c. अभिकथन A सत्य है लेकिन कारण R असत्य है d. अभिकथन A असत्य है लेकिन कारण R सत्य है	
11	Explain the following property of arithmetic mean with example 'The sum of deviations of items about arithmetic mean is always equal to zero **OR** Following is the weekly wage earnings of 19 workers. Find arithmetic mean Wages: 10, 20, 30, 40, 50 Number of workers: 4, 5, 3, 2, 5 अंकगणितीय माध्य के निम्नलिखित गुण को उदाहरण सहित समझाइए 'अंकगणितीय माध्य के बारे में मदों के विचलनों का योग हमेशा शून्य के बराबर होता है **या** निम्नलिखित 19 श्रमिकों की साप्ताहिक मजदूरी आय है। अंकगणितीय माध्य ज्ञात कीजिए वेतन: 10, 20, 30, 40, 50 श्रमिकों की संख्या: 4, 5, 3, 2, 5	**3** **1+2**
12	Define mode . Calculate mode from the following data Class Interval: 0-10, 10-20, 20-30, 30-40, 40-50 Frequency: 2, 5, 7, 5, 2 बहुलक को परिभाषित करें। निम्नलिखित डेटा से बहुलक की गणना करें कक्षा अन्तराल: 0-10, 10-20, 20-30, 30-40, 40-50 आवृत्ति: 2, 5, 7, 5, 2	**3**

<table>
<tr><td>13</td><td>‘Statistics is an indespensible tool for economics. On the light of given statement explain the importance of statistics in economics
OR
‘Census of India provide statistical information on various aspects of demographic changes in India’ on the light of given statement explain the trerm census survey. How sample survey is differ from census survey? Why sample surveys are prefered in statistics?
अर्थशास्त्र के लिए सांख्यिकी एक अनिवार्य उपकरण है। दिए गए कथन के प्रकाश में अर्थशास्त्र में सांख्यिकी के महत्व की व्याख्या करें
या
‘भारत की जनगणना भारत में जनसांख्यिकीय परिवर्तनों के विभिन्न पहलुओं पर सांख्यिकीय जानकारी प्रदान करती है’ दिए गए कथन के प्रकाश में जनगणना सर्वेक्षण की परिभाषा बताएँ। नमूना सर्वेक्षण जनगणना सर्वेक्षण से किस प्रकार भिन्न है? सांख्यिकी में नमूना सर्वेक्षण को क्यों प्राथमिकता दी जाती है?</td><td>4

1+1+2</td></tr>
<tr><td>14</td><td>‘Though a histogram looks similar to a bar diagram ,yet there are more differences than similarities between the two ‘ Write any two differences between a histogram and bar diagram . Also draw a histogram based on following information
<table>
<tr><td>Wages</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td></tr>
<tr><td>No.of workers</td><td>8</td><td>18</td><td>15</td><td>22</td><td>14</td></tr>
</table>
हालाँकि हिस्टोग्राम बार डायग्राम के समान दिखता है, फिर भी दोनों के बीच समानताओं की तुलना में अंतर अधिक हैं।’ हिस्टोग्राम और बार डायग्राम के बीच कोई दो अंतर लिखें। साथ ही, निम्नलिखित जानकारी के आधार पर हिस्टोग्राम भी बनाएँ।
<table>
<tr><td>मजदूरी</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td></tr>
<tr><td>श्रमिकों की संख्या</td><td>8</td><td>18</td><td>15</td><td>22</td><td>14</td></tr>
</table></td><td>4</td></tr>
<tr><td>15</td><td>Give a short note of the following
a. Cost of living index number
b. Loss of information in statistical data

निम्नलिखित का संक्षिप्त विवरण दीजिए
क. जीवन-यापन लागत सूचकांक संख्या
ख. सांख्यिकीय डेटा में सूचना का नुकसान</td><td>2+2</td></tr>
<tr><td>16</td><td>Read the following newspaper extract and answer the questions given below
Food weighting in India’s consumer price index may be cut as spending shifts
Food is likely to have a smaller weighting in India’s consumer price index in future, a government official said on Monday, a move that could make consumer inflation less volatile after a major household survey showed lower spending on food</td><td>2

1+1+1+3</td></tr>
</table>

	The government's first household consumption survey in over a decade, released at the weekend, showed that food's share of the rural consumption basket fell below 505 for the first time to 46% and to 39% for urban consumers. The official did not indicate what food's revised weighting in the CPI basket might be. Madhavi Arora, lead economist at brokerage Emkay Global, said the food weighting could be reduced to 40-41% from nearly 46% now, adding this could reduce volatility in inflation. a. Define index numbers b. What do you mean by weight in index numbers c. Name two methods to construct consumer price index d. Explain the uses of index numbers निम्नलिखित समाचार पत्र के अंश को पढ़ें और नीचे दिए गए प्रश्नों के उत्तर दें खर्च में बदलाव के कारण भारत के उपभोक्ता मूल्य सूचकांक में खाद्य पदार्थों का भार कम हो सकता है सोमवार को एक सरकारी अधिकारी ने कहा कि भविष्य में भारत के उपभोक्ता मूल्य सूचकांक में खाद्य पदार्थों का भार कम होने की संभावना है, यह एक ऐसा कदम है जो उपभोक्ता मुद्रास्फीति को कम अस्थिर बना सकता है, क्योंकि एक प्रमुख घरेलू सर्वेक्षण में खाद्य पदार्थों पर कम खर्च दिखाया गया है सप्ताहांत में जारी एक दशक से अधिक समय में सरकार के पहले घरेलू उपभोग सर्वेक्षण से पता चला है कि ग्रामीण उपभोग टोकरी में खाद्य पदार्थों की हिस्सेदारी पहली बार 505 से नीचे गिरकर 46% और शहरी उपभोक्ताओं के लिए 39% हो गई है। अधिकारी ने यह संकेत नहीं दिया कि सीपीआई टोकरी में खाद्य पदार्थों का संशोधित भार क्या हो सकता है। ब्रोकरेज एमके ग्लोबल की प्रमुख अर्थशास्त्री माधवी अरोड़ा ने कहा कि खाद्य पदार्थों का भार वर्तमान के लगभग 46% से घटाकर 40-41% किया जा सकता है, इससे मुद्रास्फीति में अस्थिरता कम हो सकती है a. सूचकांक संख्याओं को परिभाषित करें b. सूचकांक संख्याओं में भार से आपका क्या अभिप्राय है c. उपभोक्ता मूल्य सूचकांक बनाने की दो विधियाँ बताएँ d. सूचकांक संख्याओं के उपयोगों की व्याख्या करें	
17	c) Write any two properties of correlation d) The rank of 8 students in test in Mathematics and Statistics were as follows. Find spearman's rank correlation	**2**

Rank in Mathematics	1	2	3	4	5	6	7	8	
Rank in Statistics	4	2	1	6	8	3	5	7	**4**

OR

c) Define the term correlation

d) Find Karl Pearson's coefficient of correlation from the following data **1+5**

X	10	12	18	16	15	19	18	17
Y	30	35	45	44	42	48	47	46

a) सहसंबंध के कोई दो गुणधर्म लिखिए

b) गणित और सांख्यिकी में टेस्ट में 8 छात्रों की रैंक इस प्रकार थी। स्पीयरमैन का रैंक सहसंबंध ज्ञात कीजिए

गणित में रैंक	1	2	3	4	5	6	7	8
सांख्यिकी में रैंक	4	2	1	6	8	3	5	7

या

a) सहसंबंध शब्द को परिभाषित करें

b) निम्नलिखित डेटा से कार्ल पियर्सन का सहसंबंध गुणांक ज्ञात करें

X	10	12	18	16	15	19	18	17
Y	30	35	45	44	42	48	47	46

PART B- INTRODUCTORY MICROECONOMICS

भाग बी- परिचयात्मक सूक्ष्मअर्थशास्त्र

18 Read the following statements- Assertion (A) and Reason (R) Choose the correct alternative given below **1**

Assertion (A): PPC is concave to origin

Reason (R):AS more and more resources are shifted from the production of one good to the production of other good, marginal opportunity tends to fall

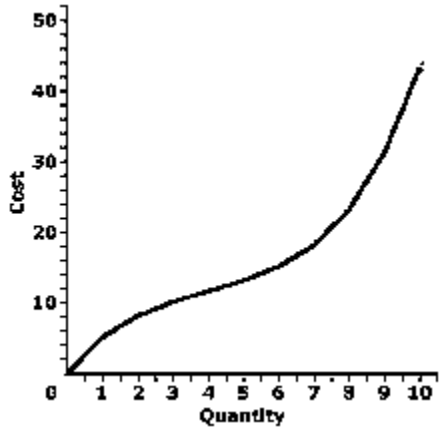
Alternatives

a) Both Assertion A and reason R are true and Reason R is the correct explanation of Assertion A
b) Both Assertion A and reason R are true and Reason R is not the correct explanation of Assertion A
c) Assertion A is true but Reason R is false
d) Assertion A is false but Reason R is true

निम्नलिखित कथनों को पढ़ें- अभिकथन (A) और कारण (R) नीचे दिए गए सही विकल्प का चयन करें

अभिकथन (A): पीपीसी मूल के लिए अवतल है

	कारण (R): जैसे-जैसे अधिक से अधिक संसाधन एक वस्तु के उत्पादन से दूसरी वस्तु के उत्पादन में स्थानांतरित होते हैं, सीमांत अवसर कम होता जाता है विकल्प a) अभिकथन A और कारण R दोनों सत्य हैं और कारण R, अभिकथन A की सही व्याख्या है b) अभिकथन A और कारण R दोनों सत्य हैं और कारण R, अभिकथन A की सही व्याख्या नहीं है c) अभिकथन A सत्य है लेकिन कारण R असत्य है d) अभिकथन A असत्य है लेकिन कारण R सत्य है	
19	Which of the following statement is correct? a. Total utility increases when marginal utility is positive b. Total utility is maximum when marginal utility is also maximum c.Total utility diminishes only when marginal utility is negative d.Both a and c निम्नलिखित में से कौन सा कथन सही है? a. सीमांत उपयोगिता सकारात्मक होने पर कुल उपयोगिता बढ़ जाती है b. सीमांत उपयोगिता अधिकतम होने पर कुल उपयोगिता अधिकतम होती है c. सीमांत उपयोगिता नकारात्मक होने पर ही कुल उपयोगिता घटती है d. a और c दोनों	**1**
20	**Read the following statements carefully and choose the correct alternative from the following:** **Statement 1**: Shift in demand curve shows extension or contraction of demand **Statement 2**: Movement along the demand curve is indicated by upward or downward movement along the same demand curve a) Both the statements are true. b) Both the statements are false. c) Statement 1 is true and Statement 2 is false d) Statement 1 is false and Statement 2 is true निम्नलिखित कथनों को ध्यानपूर्वक पढ़ें और निम्नलिखित में से सही विकल्प चुनें: कथन 1: मांग वक्र में बदलाव मांग के विस्तार या संकुचन को दर्शाता है कथन 2: मांग वक्र के साथ गति को उसी मांग वक्र के साथ ऊपर या नीचे की ओर गति द्वारा दर्शाया जाता है a) दोनों कथन सत्य हैं। b) दोनों कथन असत्य हैं। c) कथन 1 सत्य है और कथन 2 असत्य है d) कथन 1 असत्य है और कथन 2 सत्य है	**1**
21	Identify the cost curve given in the diagram	**1**

	 a. Marginal cost b. Total fixed cost c. Total variable cost. d. Average variable cost चित्र में दिए गए लागत वक्र को पहचानें a. सीमांत लागत b. कुल स्थिर लागत c. कुल परिवर्तनीय लागत d. औसत परिवर्तनीय लागत	
22	Read the following statements- Assertion (A) and Reason (R)Choose the correct alternative given below **Assertion(A).** Negative MR is possible only when price is declining **Reason (R).** Under perfect competition, AR=MR and both are constant Alternatives a.Both Assertion A and reason R are true and Reason R is the correct explanation of Assertion A b.Both Assertion A and reason R are true and Reason R is not the correct explanation of Assertion A c.Assertion A is true but Reason R is false d.Assertion A is false but Reason R is true निम्नलिखित कथनों को पढ़ें- अभिकथन (A) और कारण (R)नीचे दिए गए सही विकल्प का चयन करें अभिकथन (A). नकारात्मक MR तभी संभव है जब कीमत में गिरावट हो कारण (R). पूर्ण प्रतिस्पर्धा के तहत, AR=MR और दोनों स्थिर हैं विकल्प a. अभिकथन A और कारण R दोनों सत्य हैं और कारण R, अभिकथन A की सही व्याख्या है b. अभिकथन A और कारण R दोनों सत्य हैं और कारण R, अभिकथन A की सही व्याख्या नहीं है c. अभिकथन A सत्य है लेकिन कारण R असत्य है d. अभिकथन A असत्य है लेकिन कारण R सत्य है	**1**
23	In the context of perfect competition, which one of the following statements is not correct? a) Firm has full control over price b) Horizontal straight-line demand curve of the firm	**1**

	c)Freedom of entry and exit d)Selling cost do not exit पूर्ण प्रतिस्पर्धा के संदर्भ में, निम्नलिखित में से कौन सा कथन सही नहीं है? a. फर्म का कीमत पर पूर्ण नियंत्रण होता है b. फर्म का क्षैतिज सीधी रेखा मांग वक्र c. प्रवेश और निकास की स्वतंत्रता d. विक्रय लागत बाहर नहीं निकलती	
24	When production is zero, total cost will be: a. Zero b. equal to variable cost c. equal to fixed cost d. equal to marginal cost **OR** When Average Cost is falling: a. MC>AC b. MC<AC c. MC=AC d. None of these जब उत्पादन शून्य हो, तो कुल लागत होगी: a. शून्य b. परिवर्तनीय लागत के बराबर c. स्थिर लागत के बराबर d. सीमांत लागत के बराबर या जब औसत लागत गिर रही हो: a. MC>AC b. MC<AC c. MC=AC d. इनमें से कोई नहीं	**1**
25	Match the following and choose the correct option given below Column 1: a. Increase in supply; b. Extension of supply; c. Decrease in supply; d. Contraction of supply Column 2: i. Fall in price of inputs; ii. Fall in price of own good; iii. Rise in price of own good; iv. Price of other good rises Options a. a-iv b-i c-ii d-iii b. a-i b-ii c-iii d-iv c.a- iv b- ii c-iii d-i d. a- i b- iii c-iv d-ii निम्नलिखित का मिलान करें और नीचे दिए गए सही विकल्प का चयन करें कॉलम 1: a. आपूर्ति में वृद्धि; b. आपूर्ति का विस्तार; c. आपूर्ति में कमी; d. आपूर्ति में संकुचन कॉलम 2: i. इनपुट की कीमत में गिरावट; ii. स्वयं के सामान की कीमत में गिरावट; iii. स्वयं के सामान की कीमत में वृद्धि; iv. अन्य सामान की कीमत में वृद्धि विकल्प a. a-iv b-i c-ii d-iii b. a-i b-ii c-iii d-iv	**1**

	c.a- iv b- ii c-iii d-i d. a- i b- iii c-iv d-ii	
26	Average fixed cost (AFC)is indicated by: a. rectangular hyperbola b. a straight line parallel to X axis c.a straight line parallel toY axis d. a Ushaped curve Or Movement along the supply curve occurs due to : a. increase in own price of the commodity b. decrease in own price of the commodity c. Factors other than own price of the commodity d. Both a and b औसत स्थिर लागत (AFC) को निम्न द्वारा दर्शाया जाता है: a. आयताकार हाइपरबोला b. X अक्ष के समानांतर एक सीधी रेखा c.Y अक्ष के समानांतर एक सीधी रेखा d. U आकार का वक्र या आपूर्ति वक्र के साथ गति निम्न के कारण होती है: a. वस्तु की अपनी कीमत में वृद्धि b. वस्तु की अपनी कीमत में कमी c. वस्तु की अपनी कीमत के अलावा अन्य कारक d. a और b दोनों	**1**
27	What will be the effect on equilibrium price if supply is decreased without any change in demand ? a. No change in price b. Price will fall c.Price will rise d. None of these यदि मांग में कोई परिवर्तन किए बिना आपूर्ति कम हो जाए तो संतुलन कीमत पर क्या प्रभाव पड़ेगा? a. कीमत में कोई परिवर्तन नहीं b. कीमत गिर जाएगी c. कीमत बढ़ जाएगी d. इनमें से कोई नहीं	**1**
28	Explain the central problem of what to produce Or Explain the central problem of how to produce क्या उत्पादन किया जाए, इसकी केंद्रीय समस्या को समझाइए या कैसे उत्पादन किया जाए, इसकी केंद्रीय समस्या को समझाइए	**1+2**
29	Supposing initial denmand was 100 units. With the rise in price by Rs 5, the quantity demanded decreases by 5 units. Elasticity of demand is 1.2. Find out the price before the change in demand मान लीजिए कि आरंभिक मांग 100 इकाई थी। कीमत में 5 रुपये की वृद्धि के साथ, मांग की मात्रा में 5 इकाई की कमी हो जाती है। मांग की लोच 1.2 है। मांग में परिवर्तन से पहले कीमत ज्ञात कीजिए।	**3**
30	By using the Marginal revenue and Marginal cost approach, find the level of output at which the producer is in equilibrium. Give reasons for your answer	**2**

	Price (Rs)	10	9	8	7	6	5	4
	Output Units)	0	1	2	3	4	5	6
	TC (Rs)	2	7	9	11	14	20	27

2

सीमांत राजस्व और सीमांत लागत दृष्टिकोण का उपयोग करके, उत्पादन का वह स्तर ज्ञात करें जिस पर उत्पादक संतुलन में है। अपने उत्तर के लिए कारण बताएँ।

कीमत (रु.)	10	9	8	7	6	5	4
ईकाइयाँ	0	1	2	3	4	5	6
टीसी (रु)	2	7	9	11	14	20	27

31	'Petrol is becoming cheaper, yet the demand for car is not rising'. Does it mean that the law of demand is not operative? Explain. **OR** Giving reasons whether the following statements are true or false a. If a fall in price of good X leads to a rise in demand for good Y, then X and Y are substitute goods. b. Demand for a good always increases with the increase in income of its buyers. 'पेट्रोल सस्ता हो रहा है, फिर भी कार की मांग नहीं बढ़ रही है।' क्या इसका मतलब यह है कि मांग का नियम लागू नहीं होता? समझाइए। या कारण बताइए कि निम्नलिखित कथन सत्य हैं या असत्य a. यदि वस्तु X की कीमत में गिरावट से वस्तु Y की मांग में वृद्धि होती है, तो X और Y स्थानापन्न वस्तुएँ हैं। b. किसी वस्तु की मांग हमेशा उसके खरीदारों की आय में वृद्धि के साथ बढ़ती है।	**4** **2+2**
32	Define price floor. What are the common purposes for the price floor is set by the government. Explain with example मूल्य तल को परिभाषित करें। सरकार द्वारा मूल्य तल निर्धारित करने के सामान्य उद्देश्य क्या हैं। उदाहरण सहित समझाएँ।	**1+3**
33	Read the following extract care fully and answer the questions given below: Short-run production is the process of utilizing one or more inputs to produce output over a period of time where at least one input is fixed. Companies usually have several input factors that they use to produce their output. These input factors can include things such as land, labor, capital, and raw materials. Typically, the main inputs in short-run production are capital and labor. Some input factors are considered to be fixed inputs, which means they do not change during production.	**1+5**

	Meanwhile, other inputs are variable inputs that can be changed. For example, large machines and buildings are usually considered fixed inputs, while the number of workers hired is usually considered a variable input. Within the context of short-run production, at least one of the inputs must be fixed while the other inputs are variable. Short-run production can be related to a company's current contracts, a production that a company can complete given certain variable inputs, or a company can do without capital upgrades to its fixed inputs, such as factories. a. Define production function b. State the law of variable proportion. Explain the behaviour of Total product and Marginal Product in the different stages of production with the help of a diagram c. निम्नलिखित अंश को ध्यान से पढ़ें और नीचे दिए गए प्रश्नों के उत्तर दें अल्पकालिक उत्पादन एक या अधिक इनपुट का उपयोग करके समय की अवधि में उत्पादन करने की प्रक्रिया है, जहाँ कम से कम एक इनपुट निश्चित होता है। कंपनियों के पास आमतौर पर कई इनपुट कारक होते हैं जिनका उपयोग वे अपने उत्पादन के लिए करती हैं। इन इनपुट कारकों में भूमि, श्रम, पूंजी और कच्चे माल जैसी चीजें शामिल हो सकती हैं। आमतौर पर, अल्पावधि उत्पादन में मुख्य इनपुट पूंजी और श्रम होते हैं। कुछ इनपुट कारकों को निश्चित इनपुट माना जाता है, जिसका अर्थ है कि वे उत्पादन के दौरान नहीं बदलते हैं। इस बीच, अन्य इनपुट वेरिएबल इनपुट हैं जिन्हें बदला जा सकता है। उदाहरण के लिए, बड़ी मशीनों और इमारतों को आमतौर पर स्थिर इनपुट माना जाता है, जबकि काम पर रखे गए श्रमिकों की संख्या को आमतौर पर एक परिवर्तनीय इनपुट माना जाता है। शॉर्ट-रन उत्पादन के संदर्भ में, कम से कम एक इनपुट निश्चित होना चाहिए जबकि अन्य इनपुट परिवर्तनीय हैं। शॉर्ट-रन उत्पादन किसी कंपनी के मौजूदा अनुबंधों से संबंधित हो सकता है, एक ऐसा उत्पादन जिसे कोई कंपनी कुछ निश्चित परिवर्तनीय इनपुट दिए जाने पर पूरा कर सकती है, या कोई कंपनी अपने निश्चित इनपुट जैसे कि कारखानों में पूंजी उन्नयन के बिना काम चला सकती है। a. उत्पादन फ़ंक्शन को परिभाषित करें b. परिवर्तनीय अनुपात का नियम बताएं। एक आरेख की मदद से उत्पादन के विभिन्न चरणों में कुल उत्पाद और सीमांत उत्पाद के व्यवहार की व्याख्या करें	
34	What do you understand by consumer's equlibrium? Explain consumer's equilibrium by using budget line and indifference curve. Show diagramatically. Or A consumer , Mr Aman is in state of equilibrium consuming two goods X and Y with given prices Px and Py. Explain what will happen if: a. If Mux/Px > MUy/Py b. Py falls उपभोक्ता संतुलन से आप क्या समझते हैं? बजट रेखा और उदासीनता वक्र का उपयोग करके उपभोक्ता संतुलन की व्याख्या करें। आरेखीय रूप से दिखाएँ **अथवा**	**1+5** **3+3**

	एक उपभोक्ता, श्री अमन, दो वस्तुओं X और Y का उपभोग करते हुए संतुलन की स्थिति में है, जिनकी कीमतें Px और Py दी गई हैं। बताएँ कि क्या होगा यदि: a. Mux/Px > MUy/Py b. Py में गिरावट आती है	