तत त्वं पूषन् अपावृणु
केन्द्रीय विद्यालय संगठन

अर्थशास्त्र
Economics

कक्षा / Class XI

2025-26

विद्यार्थी सहायक सामग्री
Student Support Material

केन्द्रीय विद्यालय संगठन~Kendriya Vidyalaya Sangathan

संदेश

विद्यालयी शिक्षा में शैक्षिक उत्कृष्टता प्राप्त करना एवं नवाचार द्वारा उच्च – नवीन मानक स्थापित करना केन्द्रीय विद्यालय संगठन की नियमित कार्यप्रणाली का अविभाज्य अंग है। राष्ट्रीय शिक्षा नीति 2020 एवं पी. एम. श्री विद्यालयों के निर्देशों का पालन करते हुए गतिविधि आधारित पठन-पाठन, अनुभवजन्य शिक्षण एवं कौशल विकास को समाहित कर, अपने विद्यालयों को हमने ज्ञान एवं खोज की अद्भुत प्रयोगशाला बना दिया है। माध्यमिक स्तर तक पहुँच कर हमारे विद्यार्थी सैद्धांतिक समझ के साथ-साथ, रचनात्मक, विश्लेषणात्मक एवं आलोचनात्मक चिंतन भी विकसित कर लेते हैं। यही कारण है कि वह बोर्ड कक्षाओं के दौरान विभिन्न प्रकार के मूल्यांकनों के लिए सहजता से तैयार रहते हैं। उनकी इस यात्रा में हमारा सतत योगदान एवं सहयोग आवश्यक 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 सामाग्री 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 शिक्षा से जुड़े विभिन्न मंचों पर इसकी सराहना होती रही है। मुझे विश्वास है कि यह सहायक सामग्री विद्यार्थियों की सहयोगी बनकर निरंतर मार्गदर्शन करते हुए उन्हें सफलता के लक्ष्य तक पहुँचाएगी।

शुभाकांक्षा सहित ।

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INDEX (AS PER CBSE SYLLABUS IN ECONOMICS 2025-26)

SYLLABUS 2025-26

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Meaning, scope, functions and importance of statistics in Economics

Unit 2: Collection, Organisation and Presentation of data

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

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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.

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PART – A: STATISTICS FOR ECONOMICS

UNIT 1: INTRODUCTION

MEANING, SCOPE, FUNCTION AND IMPORTANCE OF STATISTICS IN ECONOMICS

- Statistics alternatively known as numerical information related to a particular field of study.
- Statistics in plural sense are numerical statements of facts in any field on enquiry.
- Statistics in singular sense means statistical methods.
- The five stages of statistics are collection of data, organisation of data, presentation of data, analysis of data and interpretation of data.
- **Functions of statistics**

  1. Statistics present the great mass of complex data into simple and understandable form
  2. Statistics summarizes the generalised facts and present them in a definite form.
  3. Statistics facilitates comparison of facts
  4. It helps in analysis of causes of an economic problem and facilitates formulation of policies for solving them.
  5. Statistics through its tools help in making projections for future.6. statistics is extremely useful in formulating and testing hypothesis.

- **Importance of statistics in economics**

  1. Statistics is helpful for formulation of economic laws
  2. It helps in understanding and solving an economic problem.
  3. Statistic through its tools evaluate the outcomes of any economic policies and suggest remedies.
  4. Statistics help in analysing market structure such as demand and supply, market price, cost and profit of an individual firm etc.

- **Scope of Statistics**

- Statistical data and techniques/tools are used immensely in the solution of a variety of economic problems such as production, consumption, distribution, prices, profits savings, expenditure, investment, unemployment, poverty, etc.
- The statistics of production enables us to strike a balance between supply and demand which is provided by laws of demand and supply.
- The income and wealth statistics are helpful in reducing disparities of income.
- The statistics of prices are used to study the price theories and general problem of inflation through the construction of CPI and WPI.

- The statistics of macroeconomic variables like production, income, expenditure, savings, investment etc. are useful for the compilation of National Income Accounts to know the growth of the economy over time.
- Statistical techniques have been used in determining the measures National Income Aggregates and Input-Output Analysis.
- Use of statistics in economics has led to the formulation of many economic laws like Engel's Law of Consumption, Law of Diminishing MU, Law of Demand and Supply, Revealed Preference Analysis, Law of Distribution of Income, Phillip's Curve, Environmental Kuznets Curve and the like.
- Time Series Analysis, Index Numbers, Forecasting Techniques and Demand Analysis are some of the powerful statistical techniques are used for analysis of economic data and for planning.

MCQ QUESTIONS

1. Statistics is concerned with…….
   A) Aggregate of organised facts B) aggregate of unorganised facts
   B) aggregate of useless facts C)aggregate of unrelated facts
   ANS.(A)
2. Which of the following is a characteristic of statistics?
   A) Collection of data B) Aggregate of facts
   B) Analysis of data D) Interpretation of data
   ANS. (B)

STATEMENT BASED QUESTIONS

A) Both statements are true.
B) Both statements are false.
C) Statement 1 is true but statement 2 is false.
D) Statement 2 is true but statement 1 is false.

1. STATEMENT 1: A single figure can never be called statistics.
   STATEMENT 2: Qualitative aspects like intelligence and beauty can be easily included in statistics.
   ANS.(C)
2. STATEMENT 1: The purpose of collecting statistical data needs to be decided in advance.
   STATEMENT 2: In plural terms, 'Statistics' means statistical methods.
   ANS.(C)

SHORT ANSWER QUESTIONS CARRYING ¾ MARKS

1. Discuss the importance of statistics in economic planning.

   Ans. Economic planning is a systematic approach to achieve a desired goal in a specific time with the allotted fund.

- Economic survey in different fields provide the reports in the form of data which are analysed to undertake certain new programmes or continue the same. Therefore, it guides the government to undertake policies.
- There are certain policies needed to be undertaken at macro level as well as at micro level depending on the situation. Statistics provides information whether to carry out the policies at macro level or macro level.
- The success or failure of economic planning needs to be assessed and evaluated. Statistics provides such facilities to assess the success or failure of the panning.

2. The government and policy makers use statistical data to formulate suitable policies of economic development. Illustrate with two examples.

   Ans. The government and policy makers require greater information in the form of numerical figures, to fulfil the welfare objectives. Popular statistical methods such as time series analysis, index numbers, forecasting and demand analysis are extensively used in formulating economic policies. For example:

   i) While preparing and improving new poverty alleviation programmes, government makes use of various statistical data to determine pros and cons of earlier such programmes.

   ii) While framing budget, government and policy makers make extensive use of economic surveys and data of previous years, to formulate the budget for the coming fiscal year.

UNIT 2: COLLECTION, ORGANISATION AND PRESENTATION OF DATA

1. COLLECTION OF DATA

Collection of data is the first important aspect of statistical survey.

Data – Information which can be expressed in numbers.

Informant: a person who provide the data

Investigator: - a person who collects the data

Two sources of data – Primary data & Secondary data

Primary data – data collected by investigator himself

Secondary data – data collected by someone and used by the investigator.

Difference between Primary and Secondary Data

PRIMARY DATA	SECONDARY DATA
Those data which are directly collected by the Investigator are called Primary data	Those data which are already existing are called Secondary data
Primary data are original	Secondary data are not original
Primary data are first hand data	Secondary data are not firsthand data
Primary data is costlier	Secondary data is less expensive.
Primary data required more labour.	secondary data required less labour.
Collection of Primary data consume more time	Collection of Secondary data consume less time
Primary data are more reliable	Secondary data are less reliable

Methods & Sources of Collection of Primary Data:

A] DIRECT PERSONAL INTERVIEW

In the direct personal observation method, the investigator collects data by having direct contact with units of investigation. The accuracy of data depends upon the ability, training and attitude of the investigator.

Merits:

1) We get original data. 2) we get more accurate and reliable data.

3) Satisfactory information can be extracted by the investigator through indirect questions.

4) Data are homogeneous and comparable. 5) Additional information can be gathered.

Demerits:

1) It is time consuming (2) It costs more. (3) It requires more labour

(4) requires an efficient investigator

B] INDIRECT ORAL INVESTIGATION:

In Indirect Oral Investigation method, data is collected through indirect sources. Persons, who are likely to have information about the problems, are interrogated and on the basis of their answers, factual data have to be compiled.

Merits of Indirect Oral Investigation:

(i) It is economical in terms of time, cost and manpower.

(ii) Confidential information can be collected.

(iii) Information is likely to be unbiased and reliable.

Demerits of Indirect Oral Investigation:

(i) The degree of accuracy of information is less.

(ii) This method leads to doubtful conclusion due to ignorance and carelessness of the witness

(iii) It requires an efficient investigator

C] MAILED QUESTIONNAIRE METHOD

Mailed questionnaire method of data collection is quite popular.

Under this method, a list of questions pertaining to the survey which is known as 'Questionnaire' is prepared and sent to the various informants by post. In this method, a questionnaire is sent usually by post to the persons concerned with a request to answer the questions and return the questionnaire. This method is most widely used in various economic and business surveys.

Essentials of a good questionnaire:

- The length of questionnaire should be proper one.
- The language used should be easy and simple.
- The questions should be in logical manner.
- The questions should be in analytical form.
- Complex questions should be avoided.
- The questions should be described precisely and correctly.
- The question should be structured.
- The questions should be non-disguised.

D] TELEPHONIC INTERVIEWS METHOD

Data is collected through an interview over the telephone with the interviewer. Usually, standardised questionnaires with closed-ended questions are recommended for this kind of questioning. Consequently, telephone interview is short and focused on a collection of concentrated information.

Advantages

1) Relatively low cost 2) Relatively high response rate 3) Less influence on informants

Disadvantages: Limited use and reactions cannot be watched

2. ORGANISATION OF DATA

- Organization of data refers to the systematic arrangement of figures (raw- data) in such a form that comparison of masses of similar data may be facilitated and further analysis may be possible.
- Classification is the process of arranging data into sequences and groups according to their common characteristics of separating them in to different but related parts. Characteristics of classification: Homogeneity, Clarity, Flexibility, Diversification and Suitability
- A variable is a characteristic which is capable of being measured and capable of change in its value from time to time.

Basis of Classification

Raw data can be classified as:

1. **Chronological Classification** in such a classification data is classified either in ascending or in descending order with reference to time such as years, quarters, months weeks etc.

2. **Spatial Classification**: the data are classified with reference to geographical location such as countries, states cities, districts, etc.
3. **Qualitative Classification**: data are classified with reference to descriptive characteristics like sex, caste, religion literacy etc.
4. The whole page is missing please see original manuscript, and type it.

The class mid-point or class mark is the middle value of a class. It lies halfway between the lower-class limit and the upper-class limit of a class and can be as-certained in the following manner: class mid-point = upper class limit + lower class limit/2.

*The classes, by the exclusive method are formed in such a way that the upper-class limit of one class equals the lower-class limit of the next class.

* In comparison to the exclusive method, the inclusive method does not exclude the upper class, limit in a class interval. It includes the upper class in a class. Thus, both class limits are parts of the class intervals.

*The classification of data as a frequency distribution has an inherent short- coming. While it summarises the raw data. making it concise and comprehensible. It does not show the details that are found in raw data. So, there is a loss of information in classifying raw data.

*A mass of data in its crude form is called raw data. It is an unorganised mass of the mass of the various items.

*Classification of data implies conversion of raw data in to statistical series. Broadly statistical series are of the following types:

(i) Individual series

(ii) Frequency series: (a) Discrete series or frequency array, (b) continuous series

*Individual series are those series in which the items are listed singly. For example,

Sr. No. of Labourer	Daily wages (In Rs.)
1	25
2	50
3	35
4	40
5	20
6	45

*A discrete series or frequency array is that series in which data are prescribed in a way that exact measurements of items are clearly shown. The example in following table illustrates a frequency array

Frequency array of the size of household

Size of the household	Number of household
1	5
2	15

3	25
4	35
5	10
6	5

*A continuous series: It is that series in which items cannot be exactly measured. The items assume a range of values and are placed within the range or limits. In other words, data are classified into different classes with a range, the range is called class intervals.

Frequency distribution or continuous series

Marks	Frequency
10-20	4
20-30	5
30-40	8
40-50	5
50-60	4
60-70	3

ORGANISATION OF DATA

The unclassified data or raw data are highly disorganized. They are often very large and cumbersome to handle. To draw meaningful conclusions from them is a tedious task because they do not yield to statistical methods easily. Therefore, proper organization and presentation of such data is needed before any systematic statistical analysis is undertaken. Hence after collecting data the next step is to organize and present them in a classified form.

Difference between raw data and classified data:

Basis	**Raw data**	**Classified data**
Meaning	The data which are collected originally without processing	When raw data are classified according to some common characteristics are called classified a data
Other name	Unprocessed data	Processed data
Handling	Cumbersome to handle	Easy to handle
Statistical analysis	Not useful for statistical analysis	Useful

Meaning of classification:

The process of arranging data in to homogenous group or classes according to some common characteristics present in the data is called classification or organization of data.

Purpose/Objective of Classification:

- To bring order in raw data so that they can be subjected to further statistical analysis easily
- To condense a mass of data in such a manner that similarities and dissimilarities can be readily apprehended
- To facilitate comparison
- To pinpoint the most significant features of the data at a glance

- To give prominence to the important information

Functions/Merits/Advantages of classification:

- It saves our valuable time and effort
- It enables one to locate data easily
- It makes comparison possible
- It helps in drawing inference without any difficulty

Methods of classification:

The raw data could be classified in various ways depending upon the purpose in hand. Generally, there are four methods of classification.

❖ **Chronological/Time Series Classification**

When statistical data are classified on the basis of period of time or historical elements then the classification is known as Chronological or Time Series Classification.

✔ Data are classifying with reference to time such as year, months, weeks etc.

✔ Time series are usually listed in chronological order, normally starting with the earliest period

✔ When major emphasis falls on the most recent events, a reverse time order may be used

Example:

Population of India from 1951 to 2011

Year	1951	1961	1971	1981	1991	2001	2011
Population (in Crores)	36.11	43.92	54.82	68.33	84.63	102.37	121.2

❖ ***Geographical/Spatial Classification***

When statistical data are classified with reference to geographical locations then the classification is known as Geographical or Spatial Classification.

✔ It is on the basis of on the basis of the geographical or vocational differences between the various items like states, cities, regions etc.

✔ Geographical classifications are usually listed in alphabetical order for easy reference

✔ Items may be listed by size to emphasize the important areas as in ranking the states by population

✔ Normally in reference table the first approach is followed and in summery tables the second approach is followed

Example:

Yield of wheat for different countries

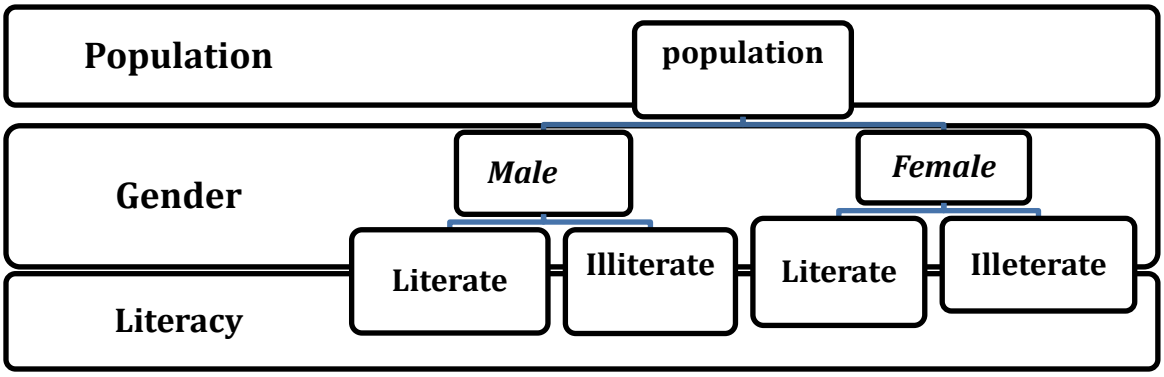
Country	America	Brazil	China	Denmark	France	India
Yield of wheat (kg/acre)	1925	127	893	225	439	862

❖ ***Qualitative/Attributive Classification***

When statistical data are classified on the basis of some attributes or qualities like gender, religion, nationality then the classification is known as qualitative/attributive classification.

- ✔ The point to note in this type of classification is that the attribute under study can not be measured, one can only find out whether it is present or absent in the units of population under study
- ✔ This may be simple classification or manifold classifications

Example:



❖ ***Quantitative Classification***

When statistical data are classified according to some characteristics which can be measured such as height, weight, sales, profits etc. then it is known as quantitative classification.

- ✔ In this type of classification, the collected data are grouped in to classes
- ✔ In this type of classification there are two elements, namely, marks–the variable and the frequency

Example:

Marks of students in Economics

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	5	10	2	15	7	9

VARIABLE: Those attributes whose values vary are called variables. For example, height, weight, years etc.

Types of Variables: (a) **Continuous variable**:

Those variables which can take any numerical values between two specified values are called continuous variable. Example: weight, time, distance

(a) Discrete variable:

Those variables which can take only certain values. For example: No. of students in a class

Difference between continuous and discrete variable

Basis	**Continuous variable**	**Discrete variable**
Meaning	Those variables which can take any numerical values between two specified values are called continuous variable	Those variables which can take only certain values
Example	Weight, time, distance	No. of students in a class
Jumps	Takes infinite jump	Takes a finite jump
Intermediate values	It can take any intermediate values between two specified values	It cannot take any intermediate values between two specified values
Values	It can take any values i.e. integers as well as fractional	It can also take any values i.e. integers as well as fractional (but cannot take intermediate vaues)
Data collection	Data is obtained by measurement	Data is obtained by counting

STATISTICAL DISTRIBUTION OR SERIES

According to Horace Secrist, a statistical series/distribution may be defined as things or attributes of things arranged according to some logical order.

Types of statistical series/distribution

On the basis of construction statistical series are of two types:

(a) Ungrouped/non-frequency/ individual series

(b) Grouped/frequency series

INDIVIDUAL SERIES:

It is a type of distribution in which the data is listed individually/singly i.e. each item is given a separate value of measurement

Example: The marks of five students are as follows: 95, 54, 65, 31, 98, 20, 67, 16, 56, 32

Distribution:

Sl.no.	1	2	3	4	5	6	7	8	9	10

Marks	95	54	65	31	98	20	67	16	56	32

DISCRETE SERIES:

Distribution of discrete variables along with its corresponding frequencies is called discrete series/distribution. This is also known as ***Frequency Array***

Formation of a discrete series

A discrete series may be constructed through the following steps

- Prepare a table with three columns with headings as, variable, tally marks, frequency
- Write the values of the variables in the first column
- In the second column put a one one vertical bar (Tally) for each times the particular value as mentioned in column 1 repeated, for each five bars make a block by giving a cross line after 4 tallies
- Finally count the no. of bars and write it in the third column
  Example:
  The marks secured by 30 students in economics are given below. Prepare a discrete distribution

10 , 50 , 20 , 10 , 30 , 10 , 20 , 20 , 50, 10 , 30 , 50 , 10 , 20 , 10 , 50 , 20 , 30 , 50 , 10 , 40 , 20 , 30 , 50 , 40 , 20 , 10 , 30 , 50 , 40

Marks	10	20	30	40	50
Tally marks	𝍸 III	𝍸 II	𝍸	III	𝍸 II
No. of students	8	7	5	3	7

CONTINUOUS SERIES /DISTRIBUTION

Distribution of continuous variables along with its corresponding frequencies is called a continuous series or ***Frequency distribution.***

Example: **Marks**	10-20	20-30	30-40	40-50	50-60
No. of students	5	3	2	8	6

Important terms used in Frequency distribution

(a) Class:

It is a group of observations represented through a range of two specified values. For example: 10-20 is a class of observation ranging values between 10 and 20

(b) Class limit:

It is the two extreme ends of a class. So, there are two class limits

i. Upper Limit (UL)– Upper end of a class, in this example it is 20
ii. Lower Limit (LL)– Lower end of a class, in this example it is 10

(c) Class interval / Class width(I):

It is the difference between the Lower Limit and Upper Limit of a class.

$$I = UL - LL$$

In this example **I**$= 20 - 10$ **= 10**

It is also called size or length of the class

(d) Class Midpoint/Class Mark(M):

It is the half of the sum of the UL and LL of a class, i.e., $M = \frac{UL+LL}{2}$ $in\ this\ example\ it\ is\ M = \frac{20+10}{2} = \frac{30}{2} = 15$. It is the representative of the class. One data are classified in to groups the class will be represented by its class mark

(e) ***Class frequency:*** It is the number of observations in a particular class. In the above example the frequency for class 10-2- is 5

(f) ***Range:*** It is the difference between the UL of the Last class and LL of the first class.
In the above example, $Range = 60 - 10 = 50$

<u>Types of continuous series:</u>

- **Exclusive series:**
  - It is a type of statistical series in which the upper-class limit of a class and lower-class limit of its next class coincides
  - In this series the value of the observation exactly equal to the upper limit of a class is excluded from the class.

Example: **Marks**	0 – 10	10 – 20	20 – 30	30 – 40
No. of students	5	2	7	3

- **Inclusive series:**
  - It is a type of statistical series in which the upper-class limit of a class and lower-class limit of its next class does not coincides
  - Both lower limit and upper limit are included in the class itself
  - Example:

Marks	10- 19	20 – 29	30 – 39	40 – 49
No. of students	5	2	7	3

<u>Steps to convert inclusive series in to exclusive series</u>

- ✔ Step-1: subtract the value of the upper limit of a class from the lower limit of its next class (in the above table 20-19=1)
- ✔ Step-2: Divide the result of step-1 by 2 and get the correction factor ($\frac{1}{2} = 0.5$)
- ✔ Step-3: Subtract the correction factor from the lower limit and add the correction factor with the upper limit and get the corrected class
- ✔ Write the corresponding frequencies against each class

Inclusive series

Marks	10- 19	20 – 29	30 – 39	40 – 49
No. of students	5	2	7	3

Exclusive series

Marks	9.5- 19.5	19.5– 29.5	29.5 – 39.5	39.5 – 49.5
No. of students	5	2	7	3

Loss of information:

- Once raw data are classified in to groups each individual observation loses their importance. This nature of the classified data is called Loss of information.
- For example: a class 20 -30 contains 5 observations, 28, 26, 23, 22, 27, when such data are classified in to groups then all the individual data have no significance
- They will be represented by their Class Mark (25) only

Bi-variate frequency distribution:

A frequency distribution of two variables simultaneously is called bi-variate frequency distribution:

Share/ Advertisement Cost ↓ →	100-200	200-300	300-400	400-500
10-20	5	3	2	7
20-30	3	8	4	9
30-40	7	5	6	2
40-50	2	5	12	3
Total	**17**	**21**	**24**	**21**

MODEL QUESTIONS WITH ANSWER:

Question 1: Which of the following alternatives is true?

(i) The class mid-point is equal to

(a) the average of the upper-class limit and the lower-class limit

(b) the product of upper-class limit and the lower-class limit

(c) the ratio of the upper-class limit and the lower-class limit

(d) None of the above

Answer: (a) The class mid-point is the middle value of a class. It lies halfway between the lower-class

limit and the upper-class limit of a class and is calculated as

Class Mid-Point or Class Mark = (Upper Class Limit + Lower Class Limit)/ 2

(ii) The frequency distribution of two variables is known as

(a) Univariate Distribution (b) Bivariate Distribution (c) Multivariate Distribution (d) None of the above

Answer:

(b) Bi means two and hence the frequency distribution of two variables is known as Bivariate Distribution.

(iii) Statistical calculation in classified data is based on

(a) the actual values of observations (b) the upper-class limits (c) the lower-class limits (d) the class mid-points

Answer:

(d) The class mid-points of each class is used to represent the class and therefore, it is used in further calculations after the raw data are grouped into classes.

(iv) Under exclusive method,

(a) the upper class limit of a class is excluded in the class interval

(b) the upper class limit of a class is included in the class interval

(c) the lower class limit of a class is excluded in the class interval

(d) the lower class limit of a class is included in the class interval

Answer: (a) Under the exclusive method we form classes in such a way that the lower limit of a class coincides with the upper class limit of the previous class. Under the method, the upper-class limit is excluded but the lower-class limit of a class is included in the interval.

(v) Range is the

(a) difference between the largest and the smallest observations

(b) difference between the smallest and the largest observations

(c) average of the largest and the smallest observations

(d) ratio of the largest to the smallest observation

Answer: (a) The variation in variable's value are captured by its range. The range is the difference between the largest and the smallest values of the variable. A large range indicates that the values of the variable are widely spread.

Question 3: What is a variable? Distinguish between a discrete and a continuous variable.

Answer: A measurable characteristic which takes different values at different points of time and in

different circumstance is called a variable as it keeps varying. Different variables vary differently and depending on the way they vary, they are broadly classified into two types. For difference between discrete and continuous variable, refer the above points in the gist.

Question 4: What is loss of information' in classified data?

Answer: Classification of data as a frequency distribution summarises the raw data making it concise and comprehensible but it does not show the details that are found in raw data. Once, the data are grouped into classes, an individual observation has no significance in further statistical calculations.

Question 5: Do you agree that classified data is better than raw data?

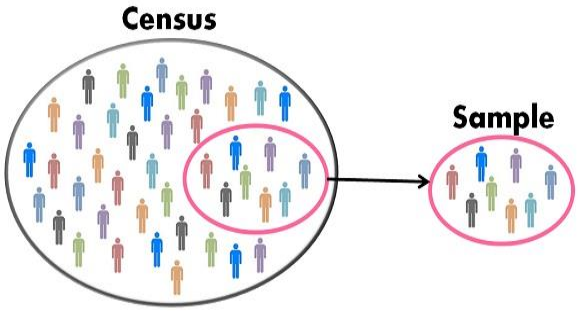
Answer: The raw data is usually large and fragmented and it is very difficult to draw any meaningful conclusion from them. Classification makes the raw data comprehensible by summarising them into groups. When facts of similar characteristics are placed in the same class, it enables one to locate them easily, analyse them, make comparison and draw inferences.

Advantages	*Disadvantages*
Personal Interview	
• Highest Response Rate • Allows use of all types of questions • Better for using open-ended questions • Allows clarification of ambiguous questions.	• Most expensive • Possibility of influencing respondents • More time-taking.
Mailed Interview	
• Least expensive • Only method to reach remote areas • No influence on respondents • Maintains anonymity of respondents • Best for sensitive questions.	• Cannot be used by illiterates • Long response time • Does not allow explanation of unambiguous questions • Reactions cannot be watched.
Telephonic Interviews	
• Relatively low cost • Relatively less influence on respondents • Relatively high response rate.	• Limited use • Reactions cannot be watched • Possibility of influencing respondents.

PILOT SURVEY: Once the questionnaire is ready, it is advisable to conduct a try-out with a small group which is known as Pilot Survey or Pre-testing of the questionnaire.

The pilot survey helps in providing a preliminary idea about the survey. It helps in pre-testing of the questionnaire, so as to know the shortcomings and drawbacks of the questions.

- Census Method – Data collected from each and every unit of population.
- Sample Method – Data is collected from few units of the population and result is applied to the whole group.
- Universe or population in statistics – Total items under study.
- Sample is a section of population from which information is to be obtained.



Census Method	Sampling Method
Every unit of population are studied	Few units of population are studied
This method is more Reliable	This method is Less Reliable
There are higher chances of accuracy	There are lower chances of accuracy
Expensive method	Less expensive method
This method consumes more time	This method consumes less time
This method requires more labor	This method requires less labor
Suitable when population is of homogenous nature	Suitable when population is of heterogeneous nature
This method is a traditional	This method is a scientific one

Sources of Secondary Data:

1. Published Source 2. Unpublished Source

Sampling Methods:

Random Sampling – It is a sampling method in which all the items have equal chance of being selected and the individuals who are selected are just like the ones who are not selected.

Purposive Sampling: - it is a type of sampling in which few items are selected on the basis of some purpose. This is also known as deliberate sampling.

Stratified Sampling: - it is a type of sampling in which all items are divided into groups and few items are selected from each group.

In quota sampling, a population is first segmented into mutually exclusive sub-groups, then fixed number of items are selected from each group.

2. **Non-random sampling** – It is a sampling method in which all the items do not have an equal chance of being selected and judgment of the investigator plays an important role.

Types of Statistical errors: 1] Sampling errors 2] Non-sampling errors

Sampling Error: It is the difference between sample value and actual value of a Characteristic of a population.

Non-sampling errors: Errors that accurate the stage of collecting data.

Types of non-sampling errors:

a] Errors of measurement due to incorrect response.

b] Errors of non-response of some units of the sample selected.

c] Sampling bias occurs when sample does not include some members of the target population.

Census of India – It provides complete and continuous demographic record of population.

National Sample Survey Organization – It conducts national surveys on socio-economic issues.

Sarvekshana – Quarterly journal published by NSSO.

3. PRESENTATION OF DATA

The process of putting data in a compact and presentable form is called presentation of data.

The collected data are generally voluminous in nature. In order to get ready reference, there is need of presenting these data in a compact and presentable form.

There are basically four forms of presentation of data.

(i) TEXTUAL PRESENTATION OF DATA:

When data is presented in the form of text that is called textual or descriptive presentation of data.

- *Example*: In 2007 out of a total of 2000 applicants in a college ,1200 were from commerce background. The number of girls was 750, out of which 330 were from science stream. In 2008, the total number of applicants was 3500 of which 2200 were boys. The number of students from science stream was 1100 of which 610 were girls.

2. TABULAR PRESENTATION OF DATA:

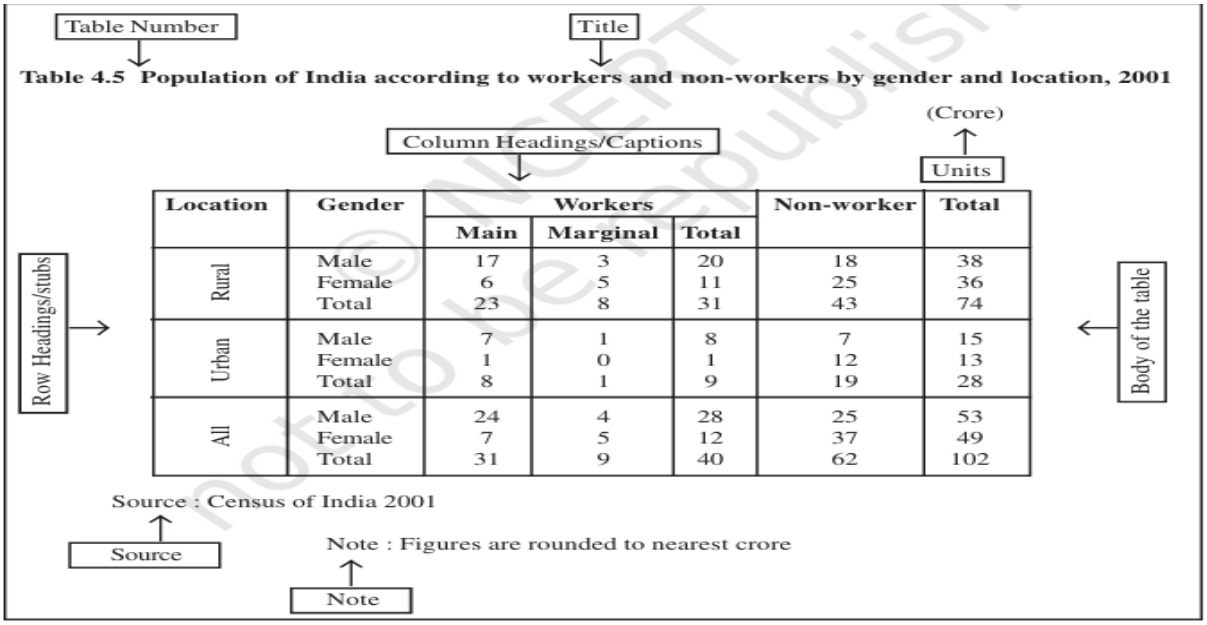
Tabular presentation of data is a way of presenting the data in rows and column manner.

Table: A statistical table is a device which present the data in rows (read horizontally) and columns (read vertically).

PARTS OF A STATISTICAL TABLE:

1. Table number 2. Title of a table. 3. Captions or Column headings. 4. Stubs or Row headings.
5. Body of the table.
6. Unit of measurement.
7. Head notes.
8. Source notes.
9. Foot notes.

SAMPLE TABLE



Location	Gender	Workers			Non-worker	Total
		Main	Marginal	Total		
Rural	Male	17	3	20	18	38
	Female	6	5	11	25	36
	Total	23	8	31	43	74
Urban	Male	7	1	8	7	15
	Female	1	0	1	12	13
	Total	8	1	9	19	28
All	Male	24	4	28	25	53
	Female	7	5	12	37	49
	Total	31	9	40	62	102

MERITS OF TABULAR PRESENTATION:

1 Tabular presentation is perhaps the simplest form of data presentation.

2. The tabulation facilitates comparison of data by presenting the data in different classes.

3. It is very easy to analysis the data from table.

4. Tabulation highlights characteristics of data.

5. Tabular presentation is a very economical mod of data presentation.

3. DIAGRAMMATIC PRESENTATION OF DATA:

Diagrammatic presentation of data translates quite effectively the highly abstract ideas contained in numbers in to more concrete and easily comprehensible form.

Utility of diagrammatic presentation:

- Diagrams are attractive and impressive.
- Easy to remember
- Diagrams simplify data.
- Diagrams save time.

TYPES OF DIAGRAMS:

The main forms of diagrammatic presentation are: **Bar Diagrams, Pie Diagram and Pictograms**

Bar diagram comprises a group of equi-spaced and equi-width rectangular bars for each class or category of data. Height or length of the bar reads the magnitude of data. The lower end of the bar touches the base line such that the height of a bar starts from the zero unit. Bars of a bar diagram can be visually compared by their relative height and accordingly data are comprehended quickly.

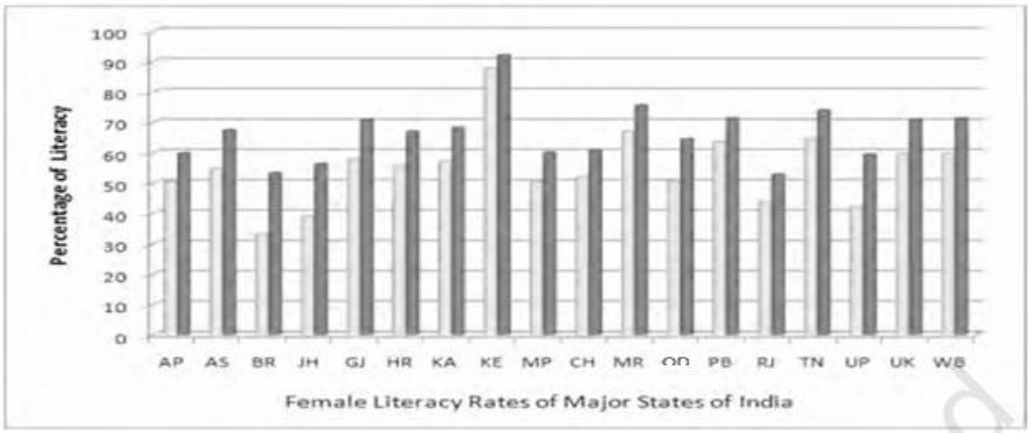
Various types of bar diagrams are: **Simple, Multiple, Sub-divided, Percentage and Deviation Bar Diagrams.**

(i) Simple Bar Diagram:

Tips to construct a Simple Bar Diagram:

- The diagrams can be horizontal or vertical.
- Height (or length) of the bar reads the magnitude of data.
- The lower end of the bar touches the base line such that the height of a bar starts from the zero unit.
- Data for this can be of frequency or non-frequency type.

(ii) Multiple Bar-Diagram: Multiple bar diagram is a component diagram in which the various components are represented in adjacent bars. This is used for comparing two or more sets of data. For example, income and expenditure or import and export for different years.



(iii) Components Bar Diagram: Component Bar diagrams are those diagrams which simultaneously present, total values as well as part values of a set of data.

(iv) Percentage Bar Diagram: Percentage Bar diagrams are those diagrams which show simultaneously different parts of the values of a set of data in terms of percentage.

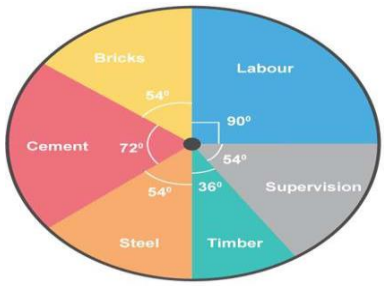
(v) Deviation Bar Diagrams: Deviation Bar diagrams are used to compare the net deviation of related variables with respect to time and location.

PIE OR CIRCULAR DIAGRAMS:

Pie diagram is a circle divided into various segments showing the percentage value of a series this diagram does not show absolute value.

Item	Percentage Share	Share in terms of degree
Labour	25	Degree share of Labour = $\frac{25}{100} \times 360 = 90°$
Bricks	15	Degree share of Bricks = $\frac{15}{100} \times 360 = 54°$
Cement	20	Degree share of Cement = $\frac{20}{100} \times 360 = 72°$
Steel	15	Degree share of Steel = $\frac{15}{100} \times 360 = 54°$
Timber	10	Degree share of Timber = $\frac{10}{100} \times 360 = 36°$
Supervision	15	Degree share of Supervision = $\frac{15}{100} \times 360 = 54°$

Prepare a Pie diagram using following information



Frequency Diagrams- Histogram, Polygon and Ogive.

Histogram: Histogram is a graphical presentation of a frequency distribution of a continuous series. While constructing histogram values of the variable are shown on the X-axis and their frequencies on the Y- axis.

Types of Histograms:

Histograms of equal class intervals: Histograms of equal class intervals are those which are based on the data with equal class intervals.

Histograms of unequal class interval: A histogram of unequal class interval is the one which is based on the data with unequal class intervals.

Frequency Polygon: Frequency polygon is another form of diagrammatic presentation of data. It is formed by joining mid-points of the tops of all rectangles in a histogram. However, a polygon can be drawn even without constructing a histogram.

Ogive Curve:

Ogive or cumulative frequency curve is the curve which is constructed by plotting cumulative frequency data on the graph paper, in the form of a smooth curve.

A cumulative frequency curve may be constructed in two ways:

Less Than Method: In this method, beginning from upper limit of the first class interval we go on adding the frequencies corresponding to every next upper limit of the series.

More Than Method: In this method, we take cumulative total of the frequencies beginning with lower limit of the first class interval.

Arithmetic line- Graphs or Time series graphs

When is set of statistical data are presented on a graph paper, it is called a graph. Rules for constructing a graph:

Every graph must have a suitable and precise heading.

One should fix an appropriate scale on which data should be presented.

As far as possible, length of x-axis on the graph paper should be one and a half times the length of y-axis.

It would be useful to give the table of data along with the graph of the data.

The construction of diagrams should flow from left to right or from bottom to the top.

Diagrams or graphs must suit the size of the paper.

Merits of Diagrammatic and Graphic Presentation

1. No need of training or specialized knowledge.
2. Attractive and effective means of presentation of data.
3. A quick comparative understanding is possible.
4. Diagrammatic or graphic presentation leaves a lasting impact on the reader's mind.
5. Graphs make information simple and understandable.

QUESTIONS:

1. Which statistical measures can be determined with the help of ogives?

(a) Mean (b) median (c) Mode (d) Mean Deviation

Answer: (b)

2. The graph of a cumulative frequency distribution is called?

(a) Ogive (b) frequency curve (c) Arithmetic line graph (d) Histogram

Answer: (a)

3. Which of the following Diagrams can be Made with the help of Histogram?

(a) Ogive (b) Bar Diagram (c) Frequency Polygon (d) pie chart

Answer: (c)

State whether the following statements are True or False from questions 4-6

4. Graphic presentation helps to identify correlation between the variables

5. Horizontal line from left to right on a graph is called ordinate

6. One variable graph does not necessarily show the values of only one variable with respect to some time period.

Answer from 4-6: 4. True 5. False 6. False.

7. The most attractive method of data presentation is:

(a) Diagrammatic (b) Textual (c) Tabular (d) Either (a) or (b)

8. In a bar diagram, the bars are:

(a) Horizontal (b) Vertical (c) Either (a) or (b) (d) None of the above

9. Diagrammatic representation of data is done by:

(a) Pictures (b) Charts (c) Diagrams (d) All these

10. Sub-divided bar diagram is used to:

(a) Study relation between different components (b) Compare different components of a variable

(c) Either (a) or (b) (d) Both (a) and (b)

11. The most appropriate diagram to represent the data relating to the monthly expenditure on different items by a family is: (a) Histogram (b) Pie diagram (c) Angular Circle Diagram (d) Line graph

12. When for some countries, the magnitudes are small and for other, the magnitudes are very large, to portray the data, it is preferred to construct:

(a) Deviation bar diagram (b) Duo-directional bar diagram (c) Broken-Scale bar diagram

(d) Any of the above

13. In case of… all the bars are of equal height and width.

(a) Multiple Bar Diagram (b) Percentage Bar Diagram

(c) Sub-divided Bar Diagram (d) Simple Bar Diagram

14. In a Pie Diagram, 1% value of data is represented by an angle at the center equal to:

(a) 3.6°(b) 36° (c) 360° (d) 0.36°

Answers from 7-16 : 7 (a) 8 (c) 9 (d) 10 (d) 11 (b) 12 (c) 13 (b) 14 (a)

Three marks questions:

17. What are the main types of one-dimensional diagrams?

Ans. (1) Simple Bar Diagram; (ii) Multiple Bar Diagram; (i) Sub-Divided Bar Diagram; (iv) Percentage Diagram; (v) Broken-Scale Bar Diagram; (vi) Deviation Bar Diagram.

18. Fill in the blanks

(i) In a simple table, data is presented according to_____characteristic only.

(ii) Heading and sub headings given to column of a table are called……

(iii) In case of tabulation, ……refer to the headings of horizontal rows.

Ans: (i) one (ii) captions (iii) title

19. Write the general rules for constructing of a graph. (any three)

Ans: 1. Every graph must have a suitable and precise heading.

2. One should fix an appropriate scale on which data should be presented.

3. As far as possible, length of x-axis on the graph paper should be one and a half times the length of y-axis.

Four marks questions

20. The strength of a school from 2015-2019 are given below. Represent the data by a simple bar diagram.

Year	2015	2016	2017	2018	2019
Strength of school	500	600	500	700	750

21. Draw the graph of interest on deposits for a year:

Deposits	10000	20000	30000	40000	50000
Interest	750	1500	2350	3300	4400

Six Marks Questions:

22. Prepare histogram and frequency polygon from the following data:

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	5	8	15	11	6	4

23. Draw the 'less than' and 'more than' ogive curve on the basis of following information.

Wages	0-20	20-40	40-60	60-80	80-100
No. of workers	10	20	40	20	10

UNIT 3: STATISTICAL TOOLS AND INTERPRETATION

1. MEASURES OF CENTRAL TENDENCY- MEAN, MEDIAN AND MODE

1. Measures of Central Tendency- Measures of central tendency is one of the statistical tools for the analysis and interpretation of data. **Central Tendency** refers to a central or typical value around which data tend to cluster. It is also known as the **measure of the average**.
2. **Average:** It is a value which is representative of a whole group of data. It is a value which comes somewhere at the centre/middle of the distribution. Since it is a value which comes at the centre and all other values tend towards it therefore Averages are also called Measures of Central Tendency.
3. **Types of Measures of Central Tendency**
   There are **three main measures**

Measure	Description	Best Used When...
Arithmetic Mean	Arithmetic average of all data values	Data is evenly distributed and without outliers
Median	Middle value when data is arranged	Data has outliers or is skewed
Mode	Most frequently occurring value in data	We need to find the most common value (e.g., fashion)

4. **Essentials of a good Average:** An ideal average should have the following characteristics:
   - It should be rigidly defined
   - It should be simple to understand and easy to calculate.
   - It should be based on all observations
   - It should be applicable for further mathematical calculation
   - It should be least affected by the presence of extreme values
   - It should not be affected by sample fluctuations

5. ARITHMATIC MEAN ($\bar{X}$)

It is the most common type of measures of central tendency. It is defined as the value obtained by dividing the sum of all observation in a series by the total number of observations.

Calculation of Arithmetic Mean (for ungrouped data/ Individual Series):

$$\bar{\bar{X}} = \frac{\sum X}{N}$$

Where: $\bar{\bar{X}}$ = Arithmetic Mean $\sum X$ = Sum of all observations N = Number of observations

If X is a variable which has values such as X1, X2, X3 …….Xn then arithmetic mean of X ($\bar{\bar{X}}$)**will be** $\bar{X} = \frac{x1+x2+x3\ldots+xn}{N}$

Example: Marks obtained: 10, 20, 30, 40, 50

$\bar{X} = \frac{10+20+30+50}{5} = \frac{150}{N5} = 30$

6. Calculation of Arithmetic Mean

METHOD	INDIVIDUAL SIRIES	DISCRETE SERIES	CONTINUOUS SERIES
Direct Method	$\bar{X} = \frac{\sum X}{N}$	$\bar{X} = \frac{\sum fX}{N}$	$\bar{X} = \frac{\sum fX}{N}$
Assumed Mean Method (Short cut method)	$\bar{X}$ = A + ∑d/N where A= Assumed mean d = X – A N = Number of observations	$\bar{X}$ = A + ∑fd/N where A= Assumed mean d = X – A f = frequency N = Number of observations	$\bar{X}$ = A + ∑fd/N where A= Assumed mean d = X – A f = frequency N = Number of

			observations
Step Deviation Method	$\bar{X} = A + (\sum d'/N) \times i$ where A= Assumed mean d = X – A i = Common factor N = Number of observations	$\bar{X} = A + (\sum fd'/N) \times i$ where A= Assumed mean d = X – A f = frequency I = Common factor N = Number of observations	$\bar{X} = A + (\sum fd'/N) \times i$ where A= Assumed mean d = X – A f = frequency I = Common factor N = Number of observations

Merits of Arithmetic Mean:

1] Easy to calculate
2] Simple to understand
3] Based on all observations
4] Capable of further mathematical calculations.
5] Least affected by fluctuations of sampling.

Demerits of Arithmetic Mean:

1] Affected by the presence of extreme values.

2] Can not be calculated in open- end series.

3] Cannot be graphically ascertained.

4] Sometimes misleading or absurd result.

7. Weighted Arithmetic Mean:

Values to be arranged are given varying importance.

$$\bar{X}_w = \frac{\sum WX}{\sum W}$$

Where $\bar{X}_w$ =Weighted Arithmetic Mean

W= Weight

X =Values of the variables

8. Median (M) is defined as the middle value of the series, when the data is arranged in ascending or descending order.

Calculation of Median 1. For Individual & Discrete Series

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

2. Continuous series: M = size of $(N/2)^{th}$ item.

$$M = L1 + \frac{N/2 - c.f}{f} \times i$$

Merits 1. Easy to understand and simple to compute.

2. Not affected by the presence of extreme values.
3. It can be located graphically.
4. Appropriate average in case of open-end classes.

Demerits:

1. Not based on all observations.
2. It requires arrangement of data.
3. Not capable for further mathematical calculation.

Mode (Mo): It is defined as the value which comes for the maximum number of times in the distribution. In other words mode is the value corresponding to the highest frequency in the distribution.

Calculation of Mode:

Individual Series:

i. By observation identify the value that occurs most frequently in a series.

ii. By conversion into discrete series and the identify the value corresponding highest frequency.

Discrete Series:

i. By Observation Method.

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

Continuous Series:

i. Determination of Modal class by Observation Method or Grouping table and Analysis table.

ii. Applying the formula

$$Mo = L + \frac{f1 - f0}{2f1 - f0 - f2} \; X \; i$$

Where, L = Lower limit of the modal class
F1 = frequency of the modal class
F0 = frequency of the class preceding the modal class
F2 = frequency of the class succeeding the modal class
I = class interval of the modal class

Merits of Mode

i. It is easy to understand and simple to calculate.

ii. Not affected by the presence of 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 observations.
iv. Not suited to algebraic treatment.

12. Relationship between Mean, Median and Mode

i. In case of symmetrical distribution

Mean = Median = Mode

ii. In case of asymmetrical distribution

Mode = 3Median – 2Mean

MCQ / 1 mark conceptual questions

1. The single value which represents the entire universe is called

(a.) Histogram (b.) Range (c.) Index Number (d.) Central tendency

2. In calculation of _____, all items are given equal importance.

(a.) Simple arithmetic means (b.)Weighted arithmetic mean (c.) Median (d.) Mode

2. To calculate arithmetic mean by direct method in individual series, we use ____formula.

(a) Σ*f*X/N (b) ΣX/N (c) Σ*f*m/N (d) A+Σ*fd*/N

3. Total of given variables is given by.

(a) Σ*fd* (b) ΣX/ N (c) Σ*f*X (d)Σ*fm*

4. Which average is the most suitable in the case of calculating average Intelligence of students in a class?

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

5. Which average is affected by extreme values?

(a) Mean (b) Mode (c)Median (d)None of the above

Answers: 1. (d) 2. (b) 3. (c) 4. (b) 5. (a)

ASSERTION – REASONING TYPE QUESTION

Read the following Assertion (A) and Reason (R) and choose the correct alternative: -

Answer Options:

a) Both assertion and reasoning are true, and the reasoning is the correct explanation for the assertion.

b) Both assertion and reasoning are true, but the reasoning is not the correct explanation for the assertion.

c) The assertion is true, but the reasoning is false.

d) The assertion is false, but the reasoning is true.

1. **Assertion (A):** Arithmetic mean is affected by extreme values.
   Reason (R): Arithmetic mean is calculated by dividing the sum of all values by the number of observations.
2. **Assertion (A):** The arithmetic mean of a data set may not be a value present in the data.
   Reason (R): Arithmetic mean is always equal to the middlemost value of a data set.
3. **Assertion (A):** Mean is the best measure of central tendency for symmetrical data.
   Reason (R): In symmetrical data, mean = median = mode.
4. **Assertion (A):** Median is not affected by extreme values.
   Reason (R): Median depends on the middlemost observation of ordered data.
5. **Assertion (A):** The median divides the data into two equal parts.
   Reason (R): Median is the arithmetic average of all observations.

Answers: 1.(a) 2.(c) 3.(a) 4.(a) 5.(c)

STATEMENT BASED QUESTIONS:

In light of the given statements, choose the correct alternative from the following:

(a) Statement I is true and Statement II is false

(b) Statement I is false and Statement II is true

(c) Both Statements I and II are true

(d) Both Statements I and II are false

Statement I: Mean is the most reliable measure for comparing different datasets.
Statement II: Mean is not affected by extreme values.

Statement I: Arithmetic mean is the most commonly used measure of central tendency.
Statement II: Arithmetic mean gives equal weight to each observation in the dataset.

Statement I: Mean is not suitable for qualitative data.
Statement II: Mean is calculated using numerical values only.

Statement I: Median is preferred over mean when the data is skewed.
Statement II: Median is affected by extreme values in the dataset.

Statement I: Median is a positional average.

Statement II: Median depends on the order of values in the dataset.

Statement I: Median can be calculated even when the data contains open-ended intervals.

Statement II: Median does not require the values to be exactly known.

Statement I: Mode is suitable for qualitative data.

Statement II: Mode identifies the most frequently occurring item in the dataset.

Statement I: A dataset always has only one mode.

Statement II: Mode is the average of all values in a dataset.

Answers: 1. (c) 2. (a) 3. (a) 4. (c) 5. (a) 6. (a) 7. (a) 8. (b)

CASE BASED QUESTIONS

Q . Read the following passage and answer the questions that follow:

Central tendency is the numerical method to explain the data in brief. The measuring of central tendency is a way of summarizing the data in the form of a typical or representative value. There are several statistical measures of central tendency or averages. The three most commonly used averages are: - Arithmetic Mean, Median, Mode.

Arithmetic Mean is the most commonly used measure of central tendency. It is simple to calculate and is based on all the observations. But it is unduly affected by the extreme items. It is defined as the sum of the values of all observations divided by the number of observations.

Median and Mode are positional averages. Median is that positional value of the variable which divides the distribution into two equal parts whereas Mode is the most frequently observed data value. Median and Mode are generally used to describe the qualitative data. Median and Mode can be easily computed graphically. Less than and More than Ogives are used to locate Median, whereas Histogram is used to locate Mode graphically.

i) Which of the following measure of central tendency is affected by extreme values?

(a) Mode (b) Mean (c) Median (d) Both a and b

ii) _____divides the distribution in two equal parts.

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

iii) Which of the following average can be located through graph?

(a) Mean (b) Median (c) Mode (d) Both b and c

2. CORRELATION

Introduction

As the summer heat rises, hill stations, are crowded with more and more visitors. Ice-cream sales become more risk. Thus, the temperature is related to number of visitors and sale of ice-creams. Similarly, as the supply of tomatoes increases in your local *mandi*, its price drops. When the local harvest starts reaching the market, the price of tomatoes drops from a princely Rs 40 per kg to Rs 4 per kg or even less. Thus, supply is related to price.

Meaning of Correlation

- Correlation studies and measures the direction and intensity of relationship among variables.

Correlation and causation

- Correlation and causation are terms which are mostly misunderstood and often used interchangeably. Understanding both the statistical terms is very important not only to make conclusions but more importantly, making correct conclusion at the end.
- Correlation measures only covariation, not causation
- correlation does not imply causation.

Why correlation does not imply causation

- A lot of times we have heard “correlation does not cause causation” or “correlation does not imply causation” or “correlation is not causation”. But what they mean actually by saying this?
- You will get a clear idea once we go through this
- **Correlation** is a statistical technique which tells us how strongly the pair of variables are linearly related and change together. It does not tell us why and how behind the relationship but it just says the relationship exists.
- **Example:** Correlation between Ice cream sales and sunglasses sold.
- As the sales of ice creams is increasing so do the sales of sunglasses.
- **Causation** takes a step further than correlation. It says any change in the value of one variable will **cause** a change in the value of another variable, which means one variable makes other to happen. It is also referred as cause and effect.
- **Example:** When there is dry, hot and sunny summer weather ice melts and there is sunburn. This is called causation.
- But the relationship between sunburn and sale of ice cream is simply correlation.
- So now we know what correlation and causation is

Correlation and Causation

Interpretation

- Correlation should never be interpreted as implying cause and effect relation
- The presence of correlation between two variables X and Y simply means that when the value of one variable is found to change in one direction, the value of the other variable is found to change either in the same direction or in the opposite direction, but in a definite way.
- **Concluding Remarks**
- **“Every causation is a correlation but every correlation may or may not be causation”.**

Types of correlation

- **On the basis of direction of change in variables:**
  - » **positive correlation**
  - » **Negative correlation**
- **On the basis of number of variables studied:**
  - » **Simple correlation**
  - » **Multiple/partial correlation**
- **On the basis of constancy of the ratio of change between the variables:**
  - » **Linear correlation**
  - » **Non-linear/curvilinear correlation**

Positive & Negative Correlation

Positive correlation

- The correlation is called positive when the variables move together in the same direction.

Example: The more time you spent on study, more marks you will secure.

X	2	4	6	8
Y	15	25	45	100

Negative correlation

- The correlation is called negative when the variables move t in opposite direction.
- **Example:** The more you miss the classes, less marks you will secure.

X	2	4	6	8
Y	100	45	25	15

Simple & Multiple Correlation

- When only two variables are studied it is a problem of simple correlation.
- **Example:** A researcher might to want the relationship between height and weight
- When three or more variables are studied it is a problem of either multiple or partial correlation.
- **Example:** A gardener wishes to determine the relationship between plant growth and certain amounts of fertilizer controlling for sunlight

Linear & Non-Linear correlation

- When the amount change in one variable tends to bear constant ratio to the amount of change in the other variable then the correlation is said to be linear.

X	10	20	30	40	50
Y	70	140	210	280	350
Ratio	1:7	1:7	1:7	1:7	1:7

- Correlation would be called non-linear or curvilinear if the amount change in one variable does not bear a constant ratio to the amount of change in the other variable

X	10	20	30	40	50
Y	70	100	240	360	400
Ratio	1:7	1:5	1:8	1:9	1:8

Properties of the Coefficient of Correlation

1. **The coefficient of correlation is a pure number**
   - It is free from the unit of measurement. There is non-existence of any unit of measurement.
2. **The coefficient of correlation lies between -1 and +1, i.e., $-1 \leq r \leq +1$**
3. **The coefficient of correlation is independent of change of origin and scale.**

If any constant is added, subtracted, multiplied or divided with all observations there will be no change in the value of coefficient of correlation

4. The degree of relationship between the two variables is symmetric

$$r_{xy} = r_{yx}$$

Degrees of coefficient of correlation

Degrees of Correlation	Positive Correlation	Negative Correlation
Perfect correlation	+1	-1
High degree correlation	Between + 0.75 and + 1	Between - 0.75 and - 1
Moderate correlation	Between + 0.50 and + 0.75	Between - 0.50 and - 0.75
Low degree	Between 0 and + 0.50	Between 0 and - 0.50
No correlation	0	0

Methods for measuring correlation

Scatter Diagram

The **Scatter Diagram Method** is the simplest method to study the correlation between two variables wherein the values for each pair of a variable is plotted on a graph in the form of dots thereby obtaining as many points as the number of observations. Then by looking at the scatter of several points, the degree of correlation is ascertained.

Some basic concepts before teaching the topic Scatter Diagram

- **Bivariate data:** Bivariate data is a fancy way to say, 'two-variable data.' The easiest way to visualize bivariate data is through a scatter plot

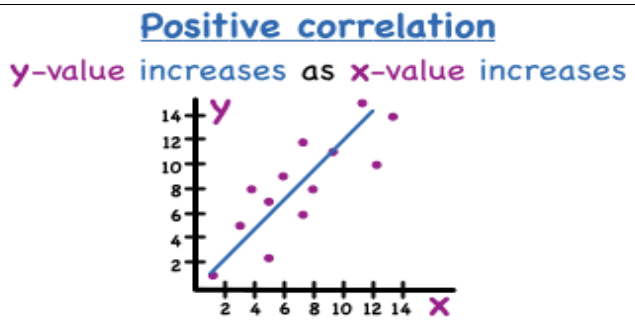
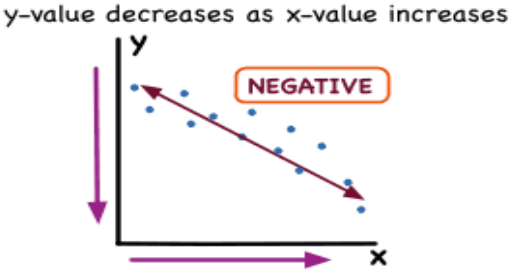
- **Scatter plots:** Scatter plots show the relationships between two variables measured on the same cases
- **Correlation:** The correlation coefficient is a measure of the direction and strength of a linear relationship
- **Outlier(s):** One or more points that do not fit the overall pattern as seen in the scatter plot
- **Line of best fit:** A line on a scatter plot which can be drawn near the points to more clearly show the trend between two sets of data
- Causation: Correlation does not imply causation i.e. a high correlation does not automatically imply that changes in one variable cause the changes in the other variable

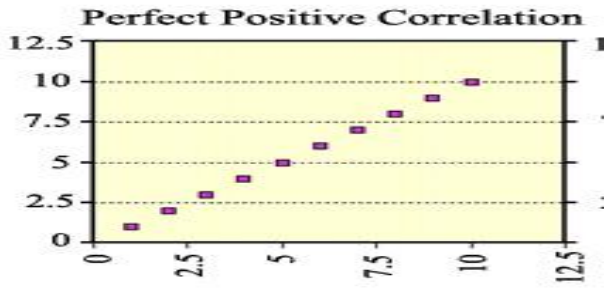
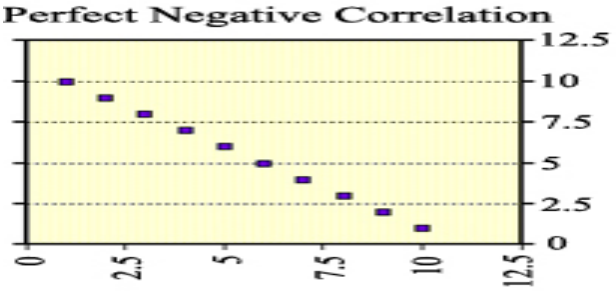
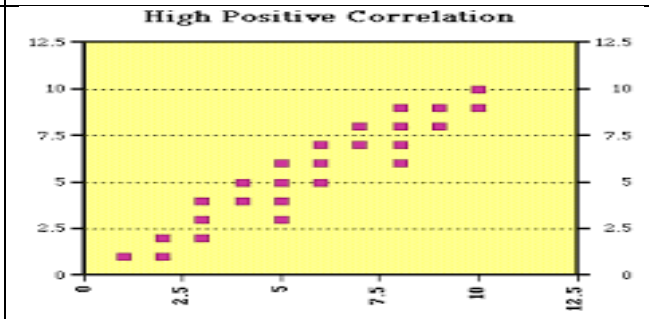
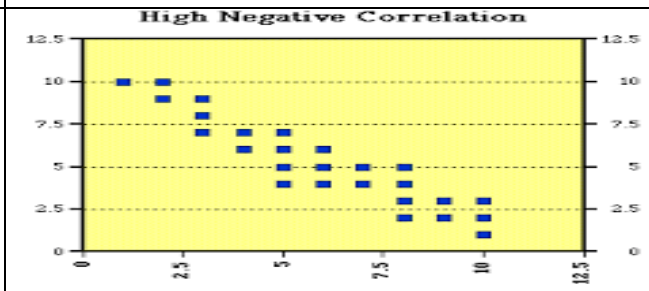
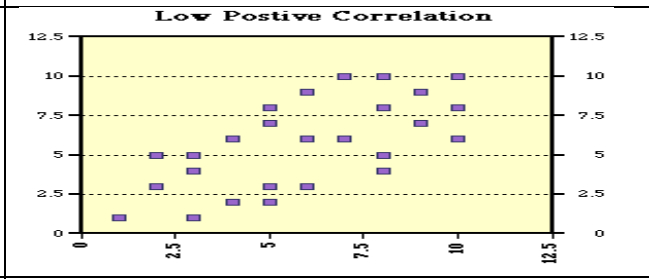
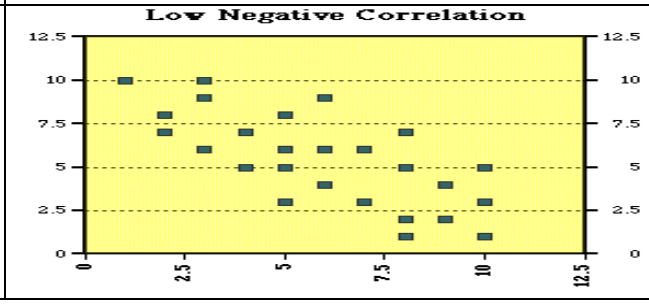
Techniques of scatter diagram

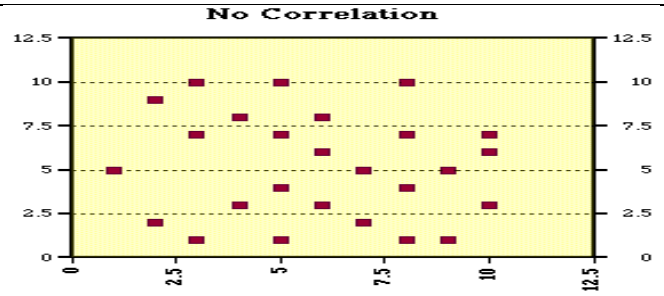
- A scatter diagram is a useful technique for visually examining the form of relationship, without calculating any numerical value
- In this technique the values of the two variables (coordinates) are plotted as points on a graph paper
- From a scatter diagram one can get a fairly good idea of the nature of relationship

Studying correlation through scatter diagram

- In a scatter diagram the degree of closeness of the scatter points and their overall direction enable us to examine the relationship
- If all the points lie on a line, the correlation is perfect and is said to be unity (Linear correlation)
- If the scatter points are widely dispersed around the line of best fit, the correlation is low

Positive correlation • If all the scatter points lie around an upward rising line it indicates the movement of variables in the same direction. Then the correlation is called Positive Correlation	
Negative Correlation • If all the scatter points lies around a downward falling line it indicates the movement of variables in the opposite direction. Then the correlation is called negative Correlation	
Degrees of correlation	

Perfect Positive correlation • If all the scatter points lie on straight line falling from the lower left hand corner to the upper right hand corner the correlation is called Perfect Positive Correlation (r=+1)	
Perfect Negative correlation • If all the scatter points lie on a straight line rising from the upper left-hand corner to the lower right-hand corner of the correlation is called Perfect Negative Correlation (r= -1)	
High degree Positive correlation • If the scatter points fall in a narrow band and shows a rising tendency from the lower left-hand corner to the upper right-hand corner the correlation is called High degree positive correlation	
High degree Negative correlation • If the scatter points fall in a narrow band and shows a declining tendency from the upper left-hand corner to the lower right-hand corner the correlation is called High degree negative correlation	
Low degree Positive correlation • If the scatter points are widely scattered and shows a rising tendency from the lower left-hand corner to the upper right-hand corner the correlation is called Low degree positive correlation	
Low degree Negative correlation • If the scatter points are widely scattered and shows a declining tendency from the upper left-hand corner to the lower right-hand corner the correlation is called Low degree negative correlation	

Zero Correlation: If the scatter points lie on a straight line parallel to the X-axis or in a hapazzered manner , it shows absence of any relationship between the variables. It is called Zero correlation or no correlation (r=0). ***Zero correlation does mean absence of correlation***	

Merits & Limitations of Scatter Diagram Method

Merits

- *It is a simple and non-mathematical method of studying correlation between the variables.*
- *It can be easily understood and a rough idea can very quickly be formed as to whether or not the variables are related.*
- *It is not influenced by the size of extreme items.*
- *Making a scatter diagram usually is the first step in investigating the relationship between two variables.*

Limitations

- By applying this method, we can get an idea about the direction of correlation and also whether it is high or low. But we cannot establish the exact degree of correlation between the variables as is possible by applying the mathematical methods.

Karl Pearson's coefficient of correlation

- Karl Person's correlation is also known as product moment correlation of simple correlation coefficient
- It gives a precise numerical value of the degree of Linear relationship between two variables.
- It is denoted by the symbol r.

Formula to calculate Karl Pearson's correlation coefficient

Standard deviation method	$r = \frac{\Sigma x y}{\sqrt{x^2}\sqrt{y^2}}$ $r = \frac{\Sigma XY}{N\sigma X \times \sigma Y}$ σX = S.D. of X series σY = S.D. of Y series
Direct method :	The standard formula used in the computation of Pearson's product moment correlation coefficient is as follows : $r = \frac{N\Sigma(XY) - \Sigma X \Sigma Y}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$

Assumed Mean Method	Assumed Mean Method: $d_x = X - A$ $d_y = Y - A$ $r = \frac{N\sum d_x d_y - (\sum d_x)(\sum d_y)}{\sqrt{N\sum d_x^2 - (\sum d_x)^2} - \sqrt{N\sum d_y^2 - (\sum d_y)^2}}$
Step Deviation Method	$r = \frac{dX' dY' - \frac{\Sigma d' X \Sigma dY'}{N}}{\sqrt{(\Sigma dx^1)^2 - \frac{(\Sigma dx^1)^2}{N} \cdot (\Sigma dy')^2 \frac{(\Sigma dy')^2}{N}}}$

Spearman's Rank Correlation

- This method was developed by the British Psychologist Charles Edward Spearman in 1904
- This measure is especially useful when quantitative measures for certain factors cannot be fixed, but the individual in the group can be arranged in order thereby obtaining for each individual a number indicating his /her rank in the group

Interpretation of Rank Correlation

- Rank correlation coefficient and simple correlation coefficient have the same interpretation
- Its formula has been derived from simple correlation coefficient where individual values have been replaced by ranks. These ranks are used for calculation of correlation.
- This coefficient provides a linear association between ranks assigned to these units, not their values.
- It is the product moment correlation between the ranks.
- All the properties of the simple correlation coefficient are applicable here. Like the Pearsonian Coefficient of correlation it lies between + 1 and – 1. However, generally it is not as accurate as the ordinary method.

Formula for rank correlation

Case-I (When ranks are given)

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

Case-II: When ranks are repeated

$$R = 1 - \frac{6\left\{\sum D^2 + \frac{1}{12}(m_1^3 - m_1) + \frac{1}{12}(m_2^3 - m_2) + \ldots\ldots\right\}}{N^3 - N}$$

MCQ QUESTION ANSWERS

Q1. What is the range of the correlation coefficient (r)?

A) 0 to 1 B) –1 to 0 C) –1 to +1 D) –∞ to +∞
Answer: C) –1 to +1

Q2. If the correlation coefficient is 0, it implies:

A) Strong positive correlation B) Strong negative correlation
C) No correlation D) Perfect correlation
Answer: C) No correlation

Q3. A perfect positive correlation is denoted by:

A) 0 B) –1 C) +1 D) ∞

Answer: C) +1

Q4. The method of correlation which uses ranks is called:

A) Pearson's method B) Scatter diagram method
C) Spearman's rank correlation D) Regression method
Answer: C) Spearman's rank correlation

Q5. Which of the following methods is most accurate for measuring correlation?

A) Scatter diagram B) Karl Pearson's method
C) Graphic method D) Tabular method
Answer: B) Karl Pearson's method

Q6. Karl Pearson's coefficient of correlation is based on:

A) Mean B) Median C) Mode D) None of these

Answer: A) Mean

Q7. In a perfect negative correlation, the value of r is:

A) +1 B) 0 C) –1 D) Between 0 and +1

Answer: C) –1

Q8. If two variables increase or decrease together in the same proportion, then the correlation is:

A) Zero B) Perfect positive C) Perfect negative D) Cannot say

Answer: B) Perfect positive

Q9. The value of Spearman's rank correlation lies between:

A) –1 and 1 B) 0 and 1 C) –1 and 0 D) –∞ to ∞

Answer: A) –1 and 1

Q10. The scatter diagram shows a downward trend from left to right. This indicates:

A) No correlation B) Positive correlation C) Negative correlation D) Perfect correlation

Answer: C) Negative correlation

Q11. Which of the following statements is true?

A) Correlation implies causation B) Correlation measures the strength of linear relationship

C) Correlation explains cause-effect D) All of the above

Answer: B) Correlation measures the strength of linear relationship

Q12. If r = 0.95, the correlation is considered:

A) Weak B) Moderate C) Strong D) No correlation

Answer: C) Strong

Assertion and Reason Questions:

Q1. **Assertion (A):** The value of correlation coefficient always lies between –1 and +1.

Reason (R): Correlation coefficient is a pure number independent of units.

Answer: A is true, R is true, and R is the correct explanation of A.

Q2. **Assertion (A):** A high correlation between two variables means one causes the other.

Reason (R): Correlation shows cause-and-effect relationship.

Answer: A is false, R is false.

Q3. **Assertion (A):** If the value of 'r' is 0, then there is no linear relationship.

Reason (R): A correlation coefficient of zero implies a perfect nonlinear relationship.

Answer: A is true, R is false.

Q4. **Assertion (A):** In Spearman's rank correlation, ranks are assigned to observations.

Reason (R): Spearman's method is suitable for qualitative data.

Answer: A is true, R is true, and R is the correct explanation of A.

Q5. **Assertion (A):** A correlation coefficient of +1 indicates perfect correlation.

Reason (R): It means both variables move in the same direction proportionally.

Answer: A is true, R is true, and R is the correct explanation of A.

Q6. **Assertion (A):** Scatter diagrams can suggest the direction of correlation.

Reason (R): In scatter diagrams, dots sloping upward indicate negative correlation.

Answer: A is true, R is false.

Q7. **Assertion (A):** Karl Pearson's method is affected by extreme values.

Reason (R): Karl Pearson's correlation uses actual values and standard deviations.

Answer: A is true, R is true, and R is the correct explanation of A.

Q8. **Assertion (A):** When the correlation coefficient is –1, the variables are unrelated.

Reason (R): A correlation of –1 means no correlation.

Answer: A is false, R is false.

Q9. **Assertion (A):** The coefficient of correlation is dimensionless.

Reason (R): It is not affected by the units of measurement.

Answer: A is true, R is true, and R is the correct explanation of A.

Q10. **Assertion (A):** When two variables are positively correlated, both increase together.

Reason (R): A positive value of 'r' indicates that when one variable increases, the other also increases.

Answer: A is true, R is true, and R is the correct explanation of A.

Q11. **Assertion (A):** Correlation helps to understand cause and effect.

Reason (R): Correlation implies causation.

Answer: A is false, R is false.

Q12. **Assertion (A):** In rank correlation, tied ranks affect the value of correlation.

Reason (R): Correction factor is added when there are tied ranks.

Answer: A is true, R is true, and R is the correct explanation of A.

3. INDEX NUMBER

Meaning of Index Number

Index number is a statistical device for measuring changes in the magnitude of a group of related variables.

Features of Index number

1. Index numbers are specialised averages.

2. They are expressed in percentages.

3. They measure the effect of change in relation to time or place.

4. They measure the changes in magnitude of certain phenomenon which are not capable of direct measurement.

Ex. Value of money, purchasing power, cost of living index etc.

Advantages/ importance of index numbers

a) Helps in policy formulation.

b) Helpful in measuring inflation and deflation.

c) Helpful in knowing the changes in standard of living.

d) Useful to assess export and import.

e) It simplifies of complexity.

f) It facilitates comparative study.

g) Use in business sphere.

h) Helpful and fixation of salary and allowances.

i) To measure the change in value of money.

Problems in construction of Index number

1. Purpose of Index number: - The purpose of index number should be clear and rigidly defined. Every index has a limited and specific use or purpose.
2. Selection of Base year: - The base year is a period of time that is used as a basis for comparing changes in prices or quantities in a given period. Base year should be a normal year.
3. Selection of number of items or commodities: - The number of items to be included in an index number should be determined by the purpose for which the index is constructed.
4. Selection of source of data: - The data is scattered over a large area, so there are chances for its being misleading. So, data should be collected from reliable and authentic sources.
5. Price quotation: - Prices of many commodities vary from place to place. So, price quotation should be collected from reliable source.
6. Selection of average: - Different types of averages such as arithmetic mean, median, mode, geometric mean etc can be used in preparing index number. So, we have to decide which average is suitable for a specific index number.
7. Selection of appropriate weights: - it refers to assigning relative importance of different items included in index number because all items are not equal important.
8. Selection of an appropriate formula: - Various formulae or methods have been devised by the

statisticians for constructing the index number. The selection of formula depends upon the purpose of index number and nature of data collected.

Types of Index Number

1. **Price Index numbers**:- They measure the general changes in prices between the current year and the base year.

A) Wholesale price Index number:- It reflects the general price level for a group of items taken at wholesale price.

B) Retail Price Index numbers:- It reflects the general changes in the retail prices of various items including food, clothing, housing and so on.

- Consumer Price Index or Cost of living index is a special type of retail price index.
- In India 3 CPI are constructed for Industrial workers, agricultural labourers by Labour Bureau, Shimla and for Urban non manual employees by Central Statistical Organisation

2. **Quantity index number**:- They measure average change in quantities produced, consumed or sold.

A) Industrial production Index:- It measures changes in the level of industrial production of various industries in public and private sector.

B) Agricultural Production Index:- It measures changes in level of agriculture production

Consumer Price Index:- (CPI)

The consumer price index reflects the average increase in the cost of commodities consumed by the specific class of people so that they can maintain the same standard of living in the current year as in the base year.

- The consumer price index is otherwise known as
    a. Cost of living index b. Price of living index c.Retail price index

Uses of Consumer Price Index: - (CPI)

a. It is used in calculating purchasing power of money and real wages.
b. It is used for grant of Dearness Allowance.
c. It is used by government for framing wage policy, price policy, rent contro, taxation etc.
d. CPI is used as price deflator of income
e. CPI is used as indicator of price movements in retail market.

2. **Wholesale Price Index (WPI): -**

- Wholesale price index number measures the change in the general price level of goods and services.
- This index is restricted to commodities which are traded on a wholesale basis like wheat, rice, edible oils etc.
- it acts as indicator of change in economy
- It does not include services.

Uses of WPI

a. Helps in forecasting the demand and supply condition of commodities in the economy.
b. Helps us to understand monetary and real value of macro aggregates like national income, total output, total employment etc.
c. Useful in the cost evaluation of different projects.
d. Measures the rate of inflation

3. **Industrial Index Number:**

- The index number for industrial production measures the changes in the level of industrial production comprising many industries.
- It includes the production of the public and the private sector
- Data of industrial production are collected under the following categories.
  - Mining & quarrying industries- coal, aluminium, petroleum etc.
  - Mechanical industries- ships, aeroplanes etc
  - Metallurgical industries-iron & steel, rolling mills etc
  - Textile industries- woollen, cotton, silk etc.
  - Industries subject to excise duties- sugar, match, tobacco etc.
  - Miscellaneous- cement, glass, soap etc.
- $IIP_{01}=\frac{\sum W(q1/q0x100)}{\sum W}$

Index Number and Inflation

Inflation is a persistent and appreciable rise in general price level of prices. In economics, wholesale price index is taken as an indicator of the rate of inflation.

Yearly rate of inflation= $\left(\frac{WPI\ of\ current\ year}{WPI\ of\ previous\ year}\text{X } 100\right)$ -100

Methods and formula of Constructing Index number

1.Simple Index Numbers/ Unweighted Index numbers

A) Simple aggregative method:

$P_{01} = \frac{\sum P1}{\sum P0} \times 100$ Where P1 is the price of current year and P0 is the price of base year

B) Simple Average of Price Relative Method:

$P_{01} = \frac{\sum R}{N}$

$R = \frac{P1}{P0} \times 100$

Consumer Price Index Number:

i) Aggregative Expenditure Method

$P_{01} = \frac{\sum P1Q0}{\sum P0Q0} \times 100$

ii) Family Budget Method

$P_{01} = \frac{\sum RW}{W}$

$R = \frac{P1}{P0} \times 100$

$W = P0Q0$

Uses Of Index Number in Economics

1. Helps in Policy formulation: Consumer price index is helpful in wage negotiations, formulation of income policy, price policy, rent control, taxation and general economic policy formulations.

Wholesale price index is used to eliminate the effect of changes in price on aggregates such as national income

2. Act as a Barometer: -Index numbers help in measuring the pulse of an economy and act as a barometer to indicate fluctuations in general economic conditions of a country.

3. Helps to measure purchasing power: -Index numbers are helpful in finding out real purchasing power of money.

4. Helps in studying trends: -Index numbers help in finding out the trend of export, imports, industrial production, prices which further help in forecasting.

5. Helps to measure and compare changes: -Index numbers provide relative measure to assess changes in group of variables over time and geographical location.

MCQ QUESTIONS

1. It is a statistical device to measure changes in the magnitude of a group of related variables.

A) Median B) Dispersion C) Index Number D) None of these

Ans: - C) Index Number

2. The value of Index number in base period is: -

A) 0 B) 10 C) 100 D) none of these

Answer: - C) 100

3. A consumer price index measures changes in: -

A) Retail price B) wholesale price C) producer price D) none of these

Answer: A) Retail price

4. Price index is used: -

A) To measure and compare prices B) to compare prices

C) to measure prices D) None of the above

Ans: A) to measure and compare prices

5. In general, inflation is calculated by using

A) wholesale price index B) consumer price index

C) producers' price index D) None of the above

Ans: - A) wholesale price index

SHORT QUESTION ANSWER (3/4) marks)

Q1 What are the desirable properties of the base year?

Ans: - Following are the desirable properties of the base year: -

1. The base year should be a normal one. It should be free from all sorts of abnormalities like wars, floods, earthquake, recession, depression, labour strikes etc.

2. The difference between base year and current year should not be too large.

Q2. Why is it essential to have different Consumer Price Index for different categories of consumers?

Answer: - It is essential to have different Consumer price index for different categories of consumers because the consumption pattern of different categories varies widely.

Also, the consumption pattern of the people of the same class differs from place to place.

That's why in India three Consumer price indexes are constructed CPI for industrial workers, CPI For urban non - manual workers and CPI for agricultural labourers.

Q3. Construct index numbers for 2015-16 taking 2010-11 as the base year from the following data by Simple Aggregative Method:

Commodity	Price in 2010-11(₹)	Price in 2015-16(₹)
Wheat	**₹ 20/kg**	**₹25/kg**
Ghee	**₹30/kg**	**₹40/kg**
Pulses	**₹60/kg**	**₹80/kg**
Sugar	**₹30/kg**	**₹40/kg**

Solution:

Commodity	Price in 2010-11(₹)	Price in 2015-16(₹)
	P_0	**P_1**
Wheat	**20**	**25**
Ghee	**30**	**40**
Pulses	**60**	**80**
Sugar	**30**	**40**
	$\sum P_0 = 140$	**$\sum P_1 = 185$**

Simple aggregative method

$P_{01} = \sum P_1 / \sum P_0 * 100$

$= 185/ 140 * 100$

$= 132.14$

The price index reveals that there is a net increase of 32.14% in prices of 2015-16 compared to prices in year 2010-11.

Q4. Construct a price index for 2015-16 taking 2010-11 as the base by simple average of price relative method.

Commodities	A	B	C	D
Prices 2010-11(₹)	10	20	30	40
Prices 2015-16 (₹)	13	17	60	70

Answer

Commodities	Prices 2010-11(₹) P0	Prices 2015-16(₹) P1	Price relative R= P1 /P0 * 100
A	10	13	13/10*100=130
B	20	17	85
C	30	60	200
D	40	70	175
			∑R = 590

Price index number using Simple Average of Price Relative method:

P_{01} = ∑R/ N Where R is price relative and N is Number of items

=590/4

=147.50

The price index number shows 47.5% increase in prices in year 2015-16 as compared to year 2010-11.

HOTS

Q1 Explain the concept of Sensex and Human development Index.

Answer: - Sensex is the short form of Bombay Stock Exchange (BSE). It is a weighted index of 30 stocks of well-established and financially sound companies. If it is rising, it indicates that the market is doing well and investors are optimistic of the future performance of the economy.

Human development index: - It is an index combining normalized measures of life expectancy, literacy, education, per capita GDP for countries worldwide. It is claimed as a standard means of measuring human development. It helps to determine whether a country is a developed, developing or underdeveloped country.

Q3. “Manipulations are not possible in case of Index Numbers.” Comment

Answer: - The given statement is incorrect. Index number can be constructed in such a manner so that the desired result can be obtained. Such a manipulation can be done by choosing a particular base, a particular group of commodities, a specific set of prices etc.

Q4. The impact of changes in the prices of a commodity with little weigh in the index will be:

A) small. B) Large. C) Uncertain. D) None of these

Answer: - A) Small

Q5. ‘Simple aggregative method is not influenced by magnitude of the prices.’ Defend or refute

Answer: - The given statement is refuted. Simple aggregative method is influenced by the prices. It means higher the price of a commodity, greater is its influence on the index number.

Part-B: Introductory Microeconomics

INTRODUCTION:

Meaning of Economy: Economy is the source of livelihood. It is a system which provides people, the means to work and earn a living. It provides living to the people by making use of available resources to produce required goods and services through the essential processes of production, consumption and capital formation.

Meaning of Economics: It is a science of human behaviour concerned with the allocation of scarce means to satisfy unlimited human wants and the resources have alternative uses. The consumer can maximize satisfaction while the producer can maximize profits. Society can maximize the social welfare.

Meaning of Micro economics: Microeconomics is a branch of economics that study the behaviour 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. Ex: individual demand, individual supply etc. The word micro means small or individual.

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

Difference between Micro economics & Macro economics

MICRO ECONOMICS	MACRO ECONOMICS
1. Studies the behaviour of individual units of an economy. For example, Individual income, individual output etc.	1. Studies the behaviour of aggregates of the economy. For example, national income, national output, etc.

2. It aims to determine price of a commodity or factors of production.	2. It aims to determine income and employment level of the economy.
3. It assumes that all macro variables remain constant.	3. It assumes that all micro variables remain constant.
4. It is also known as the Price theory	4. It is also known as Income and employment theory.
5. Its main determinant is price.	5. Its main determinant is income.
6. It provides solution to the problem of "what to, how to & for whom to produce".	6. It provides solution to the problem of full utilisation of resources in the economy.

Meaning of positive economics:

Positive economics is related with describing and explaining economic phenomena. It focuses on facts and behavioural relationships of cause on facts and behavioural relationships of cause & effect and includes the development & testing of economic theories.

Examples of Positive economics:

1. **An increase in the minimum wage will lead to a decrease in employment.**
2. **In India, around 50% workers are self-employed.**
3. **A decrease in the price of iPhones leads to an increase in the quantity demanded."**

Meaning of normative economics: Normative economics is related with value judgements, opinion and what ought to be. It is a subjective statement related with what
Government should increase taxes on tobacco products in order to reduce something ought to be instead of what is.

Examples of Normative economics:

1. The smoking.
2. It is wrong for people to discriminate against others based on their race or ethnicity.
3. Higher education should be free for all students. Tuition fees should be abolished.
4. Unemployment should be reduced in the country.

Difference between Positive & Normative economics

POSITIVE ECONOMICS	NORMATIVE ECONOMICS
1. Deals with economic behaviour based on facts. For example Mr. A says that prices are rising in India & Mr B says that prices are under control in India. 2. It can be verified with actual data. 3. Does not give any value judgments. 4. Relates to 'what was', 'What is' and 'what would be'? 5. May not be necessarily statements	1. Deals with opinions related to economic issues. For example, Income inequalities should be reduced OR Unemployment is not good for an economy. 2. It cannot be verified with actual data. 3. It gives value judgments. 4. Relates to what ought to be. 5. These statements cannot be termed as true or false.

ECONOMIC PROBLEM: It is the problem of Choice making which arises due to unlimited human wants, Limited Resources & these limited resources having alternative uses.

Central problems of Economy

1. **What to produce**: This problem refers to what goods are to be produced whether to produce normal goods or luxury goods, consumer goods or capital goods. After deciding what goods are to be produced then you have to decide how much quantity of each good to be produced whether to produce more of normal goods or luxury goods etc.
2. **How to produce**: This problem refers to the technique of production. There are mainly two types of techniques.

   Labour intensive: Use of more labour than machines

   Capital intensive: Use of more capital than labour.

   Producer may use either labour intensive or capital intensive or both depending on the resources available.
3. **For whom to produce**: It is the problem related to distribution of produced goods among the different group of the society.

It has two aspects:-

1. Personal distribution
2. Functional distribution

Personal distribution: - When the National Income is distributed according to the ownership of the factors of production.

Functional distribution: - When the national Income/Production is distributed among different factors of production like Land, Labour, capital and Entrepreneurship for providing their service in term of rent, wages, interest and profit respectively.

Opportunity cost: Opportunity cost is an important basic concept in the subject economics. It is defined as the next best alternative good sacrificed. 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.

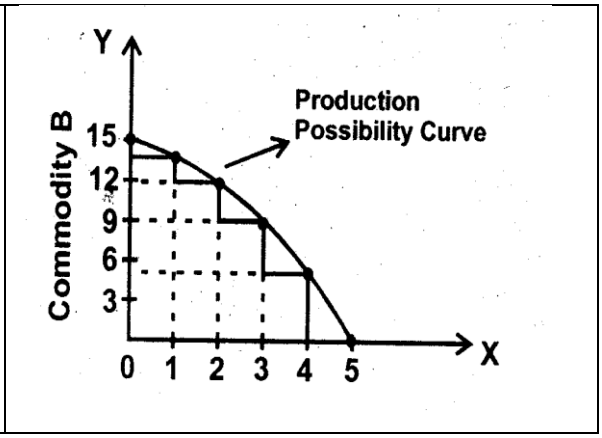
Production possibility curve: It is the graphical presentation of various combinations of two goods that can be produced with the given resources and technology.

Properties of PPC:

1. It slopes downwards means if producer wants to produce more of one good he has to reduce the production of other good.
2. PPC is concave shaped it is because of increasing marginal opportunity cost.

PRODUCTION POSSIBILITY SCHEDULE

Good X	Good Y	MOC
0	15	-
1	14	1
2	12	2
3	9	3
4	5	4
5	0	5

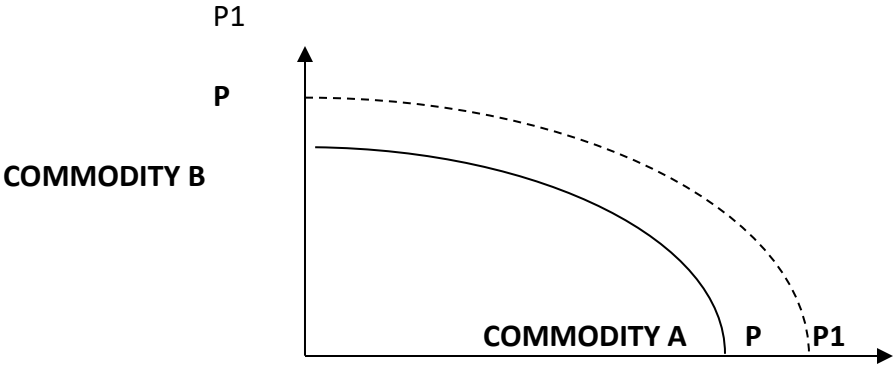


Commodity A

SHIFT IN PPC: (1) Upward shift/Right ward: (Economic Growth)

(a) When there is improvement in technology.

(b) Increase in resources.



QUESTION BANK

1 MARK QUESTIONS:

1. PPC will be straight line, when MOC is……

(a) Increasing (b) Decreasing (c) Constant (d) None of these.

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**. Statement 1:** Economic problem is a problem of choice making.

Statement 2: Economic problem is the problem of developing countries only.

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. **Statement 1**: PPC is related to production of two commodities.

Statement 2: PPC is not related to the level of technology.

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): The value of the benefit that is sacrificed by choosing an alternative is known as opportunity cost.

Reason (R): MOC decides the shape of PPC.

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. **Assertion (A):** In case of PPC, with the increase in production of good X, the production of good Y increases.

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.

7**. What does a point below the PPC show? (Choose the correct alternative)**

a) Underutilization of resources

b) Fuller utilization of resources

c) Growth of resources

d) All of the above

8. **PPC is concave to origin, when marginal opportunity cost is --------- (Choose the correct alternative)**

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

9. **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

10. Economic problem is the problem of choice making. (True or false)

1 MARK QUESTIONS ANSWER

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

7	a) Underutilization of resources
8	a) Rises
9	a) Due to increasing MOC
10	True

CASE BASE QUESTIONS-I

Read the following hypothetical text and answer the given questions:

In reality, all economies are mixed economies where some important decisions are taken by the government and the economic activities are by and large conducted through the market. The only difference is in terms of the extent of the role of the government in deciding the course of economic activities. In the United States of America, the role of the government is minimal. The closest example of a centrally planned economy is the China for the major part of the twentieth century. In India, since Independence, the government has played a major role in planning economic activities. However, the role of the government in the Indian economy has been reduced considerably in the last couple of decades.

1. Whether the following statement is True or false:

"A centrally planned economy has been followed by India in the last two decades".

2. Economy may be classified as: (a) Capitalist (b) socialist (c) mixed (d) all of these

3. Which economy has a co-existence of private and public sectors?

(a) Capitalist (b) Mixed (c) Socialist (d) none of these

4. In the USA, the role of the government is minimal, due to:

(a) Capitalist economy (b) socialist economy (c) mixed economy (d) all of these

CASE BASED QUESTIONS-II

· **Read the following hypothetical text and answer the given questions:**

Each economy has scarce resources and will have possibility of being exhausted gradually after a continuous use. Growth of resources, therefore, become a basic problem of the economy. It can achieve this objective through technological advancement. Under-developed countries like India, Pakistan, and Thailand etc. have remained poor because of poor growth of their resources. Besides fuller utilization of resources, these countries should try to raise their productive Page 22 of 29 capacities, by exploring further availability of natural resources and discovering better techniques for their use. Moreover, full use of productive capacity is also indispensable for the growth of the economy. Since economic theory is classified into Micro and Macro Theory. Microeconomic theory deals with the allocation of resources in the market economy. In this theory, decisions regarding 'what', 'how' and 'for whom' to produce are

decided on the basis of price mechanism. Goods are freely bought and sold in the market economy on an agreed price. Macroeconomic theory deals with the fuller and efficient use of resources. It also deals with the growth of resources and problems relating saving, investment, inflation, unemployment etc. Development economics deals with the problem of growth of resources.

1. **Which is a central problem of an economy?**

(a) Allocation of resources (b) optimum utilisation of resources

(c) Economic development (d) all of these

2. **To which factor, economic problem is basically related to:**

(a) Choice (b) Consumer selection (c) firm selection (d) none of these

3. **What measures have been followed by India to raise its productive capacities by exploring?**

(a) Technique (b) Natural resources (c) Discovering better technique (d) all of these

4. Macro Economics deals with the …….. (a) Allocation of resources (b) Aggregate use of resources (c) both (a) & (b) (d) none of these

2. Explain the central problem" how to produce"?

Answer: This problem refers to the technique of production. There are mainly two types of techniques.

Labour intensive: Use of more labour than machines

Capital intensive: Use of more capital than labour.

Producer may use either labour intensive or capital intensive or both depending on the resources available.

3. **Make a difference between positive economics & normative economics.**

POSITIVE ECONOMICS	NORMATIVE ECONOMICS
1. Deals with economic behaviour based on facts. For example Mr. A says that prices are rising in India & Mr B says that prices are under control in India.	1. Deals with opinions related to economic issues. For example, Income inequalities should be reduced OR Unemployment is not good for an economy.
2. It can be verified with actual data.	2. It cannot be verified with actual data.
3. Does not give any value judgments.	3. It gives value judgments.
4. Relates to 'what was', 'What is' and 'what would be'?	4. Relates to what ought to be.
5. May not be necessarily statements	5. These statements cannot be termed as true or false.

4. Distinguish between Micro & Macroeconomics.

MICRO ECONOMICS	MACRO ECONOMICS

1. Studies the behaviour of individual units of an economy. For example, Individual income, individual output etc.	1. Studies the behaviour of aggregates of the economy. For example, national income, national output, etc.
2. It aims to determine price of a commodity or factors of production.	2. It aims to determine income and employment level of the economy.
3. It assumes that all macro variables remain constant.	3. It assumes that all micro variables remain constant.
4. It is also known as the Price theory	4. It is also known as Income and employment theory.
5. Its main determinant is price.	5. Its main determinant is income.
6. It provides solution to the problem of "what to, how to & for whom to produce".	6. It provides solution to the problem of full utilisation of resources in the economy.

4. Define opportunity cost with the help of an example.

Opportunity cost: Opportunity cost is the cost of next best alternative sacrificed.

For example: Suppose, you are working in a bank at the salary of Rs40, 000 per month. Further suppose, you receive two more job offers, to work as an executive at Rs.30, 000 per month or to be a journalist at Rs.35000 per month. In the given case the opportunity cost of working in the bank is the cost of next best alternative sacrifices i.e. Rs.35,000.

5. What do you mean by Production Possibility Curve (PPC)? Write the main features of PPC.

Ans: 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. 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.. The main features of PPC are as follows:

1. PPC slopes downwards from left to right.
2. PPC is concave to origin

6. Discuss the central problem of an economy.

Ans: Three central problems of an economy are as follows:

(*a*) What to produce? An economy has millions of commodities to produce. It has to decide whether to produce luxury goods or wage goods; or it may have to decide between capital goods or consumer goods. Having decided what to produce, it also has to decide how much to produce.

(*b*) How to produce? The next choice is the choice of technique of production. Every economy faces the problem of as to how resources should be combined for the production of a given commodity. Depending upon the availability of a particular factor of production, an economy may choose between labour-intensive or capital-intensive techniques.

(*c*) For whom to produce? What goods should be consumed and by whom depends upon how national product is distributed among people/factor owners.All central problems arise due to scarcity of resources having alternative uses.

CONSUMER'S EQUIULIBRIUM

Consumer: A Consumer is a person or an entity who makes some purchases to fulfil his wants.

Utility: The quality of a commodity to satisfy wants is called utility.

TOTAL UTILITY: - The sum total of utility derived from the consumption of all the units of a commodity.

-TU can be derived by adding the MU.

-TU=$MU_1 \quad + MU_2 \quad + \ldots\ldots\ldots + MU_n \quad = \sum MU$

MARGINAL UTILITY: - MU is the utility derived from the consumption of an additional unit of commodity.

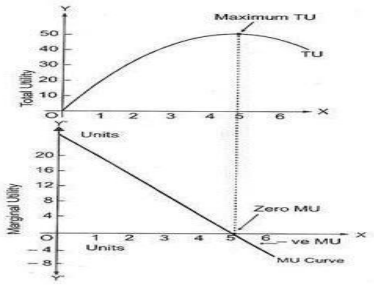
$$MU \; = \; TU_n \quad - \; TU_{n-1}$$

Difference between Cardinal Utility and Ordinal utility

Cardinal Utility	Ordinal Utility
The satisfaction that consumer derives from consumption of goods and services are measured in utils.	The satisfaction that consumer derives from consumption of goods and services are not measured but ranked
Introduced by Alfred Marshall	Introduced by J R Hicks
It is Quantitative method	It is Ranking system or Qualitative method

Law of Diminishing Marginal Utility (Cardinal Approach)

According to Law of Diminishing Marginal Utility, as we consume more and more of Goods continuously, the marginal utility goes on diminishing.



Relationship between Marginal Utility and Total Utility

- When MU decreases but stay positive,TU increases at a diminishing rate
- When MU is zero, TU is constant and maximum
- When MU decreases but stay negative,TU starts declining

Conditions of Consumer's Equilibrium (MU Analysis):

A) Single Commodity: Mu x = P x (MU of a commodity in terms of money should be equal to its price)

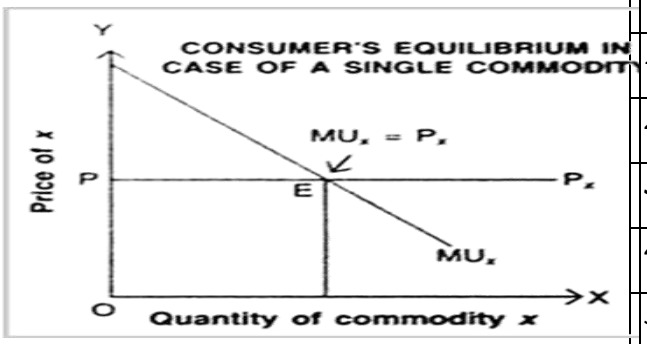
B) Two Commodity: MU x = MU y (MU of last rupee spent on each commodity should be equal)

CONSUMERS EQUILIBRIUM: -

It means allocation of income by a consumer on goods and services in a manner that gives him maximum satisfaction. It is a situation when a consumer gets maximum satisfaction with limited

income and has no tendency to change his way of existing expenditure to change his consumption pattern is known as Consumer's equilibrium.

DIAGRAM



SCHEDULE

No of commodity	*MUx*	*MUm*	*MUx / P X*
1	*18*	*7*	*18/2=9*
2	*16*	*7*	*16/2=8*
3	***14***	***7***	***14/2=7***
4	*12*	*7*	*12/2=6*
5	*10*	*7*	*10/2=5*

ORDINAL APPROACH (Indifference Curve Analysis):

Ordinal Utility Approach states that the satisfaction which the consumer derives from the consumption of goods and services can't be measured in numbers rather it is ranked in order of preference.

- **Monotonic preference**: Among two bundles, a rational consumer prefer that bundle which has more of at least one of the goods and no less of other good as compared to any other bundle.
- **Budget Set**: Set of bundles available to consumer within the budget constraint.
- **Budget Line**: It shows all combinations of two goods that a consumer can purchase and the cost of which is exactly equal to his money income.
- **Equation of Budget line**: P1X1+P2X2=M

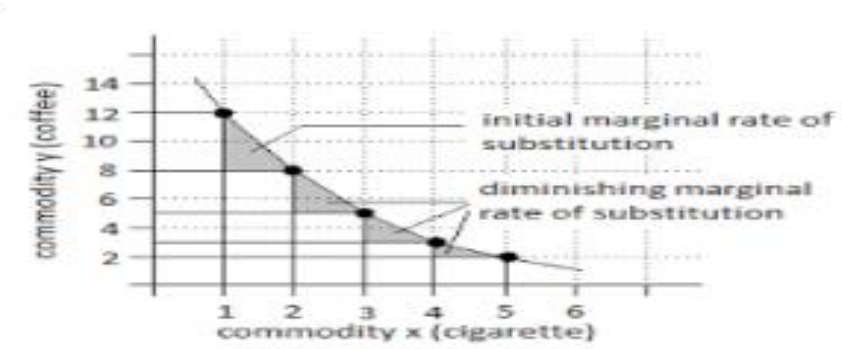
Indifference Curve:
A curve showing various combinations of two goods which gives consumer same level of satisfaction
Properties of IC:
1. It slopes downwards from left to right.
2. It is always convex to the origin due to decreasing Marginal Rate of Substitution (MRS).
3. Higher IC always IC always gives higher satisfaction
4. Two ICs never intersects each other.

Indifference Map: Group of indifference curves that gives different levels of satisfaction to the consumer.

Marginal rate of Substitution (MRS): It is the rate at which a consumer is willing to give up one good to get one more unit of another good.

$$MRS_{xy} = \frac{\Delta Y}{\Delta X}$$

COMMODITY X	COMMODITY Y	MRS_{xy}
1	25	-
2	20	5:1
3	16	4:1
4	13	3:1
5	11	2:1



Consumer Equilibrium:-

Equilibrium under indifference curve approach is defined with the help of indifference map and the budget line which satisfy the following two conditions –

(a) **Necessary condition** –

Marginal rate of substitution =Market rate of exchange

(b)**Sufficient condition** –

is convex at the point of Equilibrium

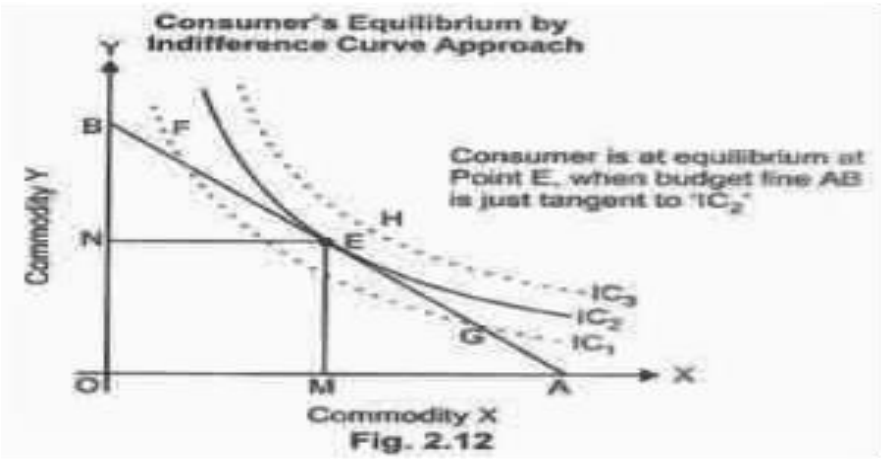


Fig. 2.12

DEMAND

DEMAND

Meaning of Demand- The quantity of a commodity that a consumer is willing to buy and is able to buy, given prices of goods and consumer's tastes and preferences is called demand for the commodity.

Generally, desire, wants and demand in economics all these terms have different meanings.

Let's us understand the 3 different terms:

1. Desire means a mere wish to have a commodity.
   For e.g: Desire of a poor person for a car with just Rs 200 in his pocket. So, desire is just a wish to possess something.

2. Wants is that desire which is backed by the ability and willingness to satisfy it:
   Every desire is not a want. But a desire can become a want if the person is in a position to satisfy.
   For Eg: In the above example, if the poor person wins a lottery and now, he has enough money to buy a car, then his desire for car will now be termed as want.
3. Demand is an extension to wants as it has two more characteristics:

a) Demand is always defined with reference to price.

b) Demands always with respect to a period of time.

Demand for a commodity may be either with respect to an individual or to the entire market.

1. 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.
2. Market Demand: Refer to the quantity of a commodity that all consumer are willing and able to buy at each possible price during a given period of time.

Determinants of Demand (Individual Demand)

1. Price of the given commodity
2. Price of related goods.
3. Income of the consumer
4. Tastes &Preference
5. Expectation of changes in the price in future.

Determinants of Market Demand

1. Size and composition of population
2. Season and Weather
3. Distribution of income.

Demand Function: Demand function shows the relationship between quantity demanded for a particular commodity and the factors influencing it.

Individual Demand Function- refers to the functional relationship between individual demand and the factor affecting individual demand. It is expressed as

$D_x=f(P_x, P_r, Y, T, F)$

Where

D_x=Demand for commodity x

P_x =Price of the given commodity x

P_r = Price of related goods

Y = Income of the consumer

T = Taste and preference

F=Expectation of change in price in future.

Market Demand Function

Market demand function refers to the functional relationship between market demand and the factors affecting market demand.

Market demand is affected by all factors affecting individual demand. In addition, it is also affected by size and composition of population, season and weather and distribution of

income.

So , market demand function can be expressed as

$$D_x = f(P_x, P_r, Y, T, F, P_o, S, D)$$

Where, D_x=Demand for commodity x

P_x =Price of the given commodity x

P_r = Price of related goods

Y = Income of the consumer

T = Taste and preference

F = Expectation of change in price in future.

P_o=Size and composition of population

F= Expectation of change in price in future

D= Distribution of income

S=Season and Weather

Demand Schedule

Demand schedule is a tabular statement showing various quantities of a commodity being demanded at various levels of price, during a given period of time.

1) Individual Demand Schedule
2) Market Demand Schedule

Individual Demand Schedule: Individual demand schedule refers to a tabular statement showing various quantities of a commodity that a individual consumer is willing to buy at various levels of price, during a given period of time.

Price(in Rs)	Quantity Demanded of Commodity X
5	1
4	2
3	3
2	4
1	5

As seen in the schedule, quantity demanded of 'x' increases with decreases in its price. The consumer is willing to buy 1 unit at Rs 5. When price falls to Rs 4, demand rises to 2 units.

Market Demand Schedule: Market demand schedule refers to 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. It is the sum all individual demand schedules at each and every price.

Market demand schedule can be expressed as

$D_m = D_A + D_B + \ldots\ldots\ldots\ldots$

Where Dm is the market demand and $D_A+D_B+\ldots\ldots$ are the individual demands of Household A, Household B and so on.

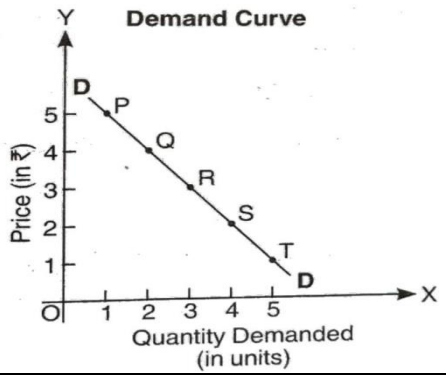
Price (Rs)	Individual Demand (in units)		Market Demand (in units)
	Household A (DA)	Household B (DB)	
5	1	2	1+2=**3**
4	2	3	2+3=**5**
3	3	4	3+4=**7**
2	4	5	4+5=**9**
1	5	6	5+6=**11**

Market demand is obtained by adding demand of household A and B at different prices. At Rs 5 per unit, market demand is 3 units. When price falls to Rs 4, market demand rises to 5 units. So, market demand schedule also shows the inverse relationship between price and quantity demanded.

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.

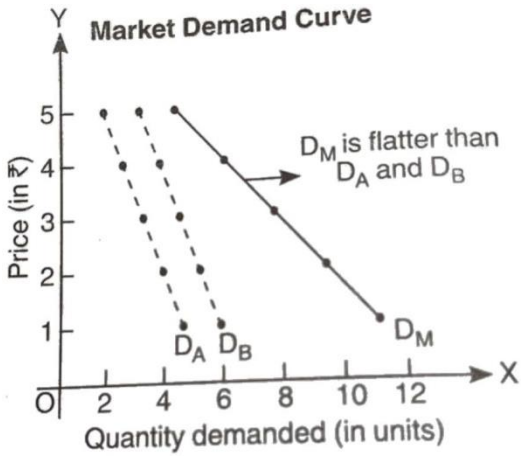
- It shows the inverse relationship between the quantity demanded of a commodity with its price, keeping other factor constant.
- Like demand schedules, demand curves can also be drawn both for individual buyers and for the entire market. So, demand curve is of two types.
  - i) Individual Demand Curve
  - ii) Market Demand Curve.

Individual Demand Curve: Individual demand curve refers to a graphical representation of individual demand schedule.



As seen in the diagram, price is taken on the vertical axis (Y-axis) and quantity demanded on the horizontal axis (X-axis). At each possible price, there is a quantity, which the consumer is willing to buy. By joining all the points (P to T), we get a demand curve 'DD'.

Market demand curve refers to a graphical representation of market demand schedule. It is obtained by horizontal summation of individual demand curves.



D_A and D_B are the individual demand curves. Market demand curve (DM) is obtained by horizontal summation of the individual demand curves.

Law of Demand: Law of demand states to inverse relationship between price and quantity demanded, keeping other factor constant. This law is also known as the 'First Law of Purchase'.

Assumption of Law of demand

While stating the law of demand, we use the phrase 'keeping other factors constant'. This phrase is used to cover the following assumption on which the law is based:

1. Price of substitute goods do not change.
2. Prices of complementary goods remain constant.
3. Income of the consumer remains the same.
4. There is no expectation of change in price in the future
5. Tastes and preferences of the consumer remain the same.

Law of demand can be better understood with the help of table and graph

Demand Schedule

Price(in Rs)	Quantity Demanded of Commodity X
5	1
4	2
3	3
2	4
1	5

Clearly shows that more and more units of commodity are demanded when price of the commodity falls. Demand curve DD slopes downwards from left to right, indicating an inverse relationship between price and quantity demanded.

Why other factors are kept constant?

The quantity demanded of a commodity depends on many factors, besides price of the given commodity. If we want to understand the separate influence of one factor, it is necessary, that

all other factor is kept constant. Therefore, while discussing the 'Law of Demand', it is assumed that there is no change in the other factors.

Individual Demand Vs Market Demand

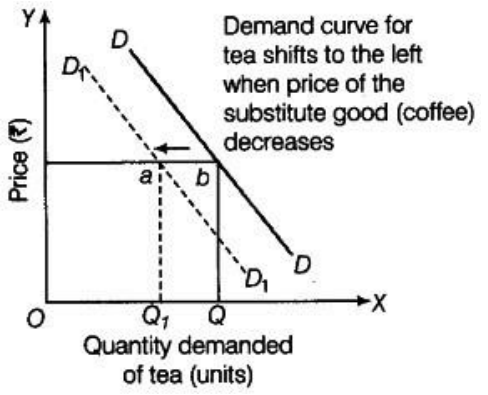
Individual Demand	Market Demand
It is the quantity demanded of a commodity by an individual consumer at a given price during a given period of time	It is the quantity demanded of a commodity by all the consumers at a given price during a given period of time
It may or may not follow the law of Demand, i.e. it is possible that an individual consumer may demand more even at higher price.	It always follows the Law of Demand, i.e market demand always falls with rise in price and vice-versa
Individual demand is not affected by all the factors affecting market demand	Market demand is affected by all the factors affecting individual demand.

Substitute Goods and Complementary goods

Substitute Goods

Substitute goods are those goods which can be used in place of one another for satisfaction a particular want, like tea and coffee.

Demand for a given commodity varies directly with the price of substitute good. For Eg: if price of a substitute good (say, coffee) increases, then demand for given commodity (say, tea) will rise as tea will become relatively cheaper in comparison to coffee. As seen in the given diagram, price of coffee (substitute good) is shown on the Y-axis and demand for tea (given commodity) on the X-axis. When price of coffee rises from OP and OP_1 demand for tea also rises from OQ to OQ_1



Complementary Goods

Complementary goods are those goods which are used together to satisfy a particular want. Demand for given commodity varies inversely with the price of a complementary good. For Eg: if price of a complementary good (say, sugar) increases, then demand for given commodity (say, tea) will fall as it will be relatively costlier to use both the goods together.

As seen in the given diagram, price of sugar (complementary good) is shown on the Y- axis and demand for tea (given commodity) on the X-axis. When the price of sugar rises from OP to OP_1 demand for tea falls from OQ to OQ_1

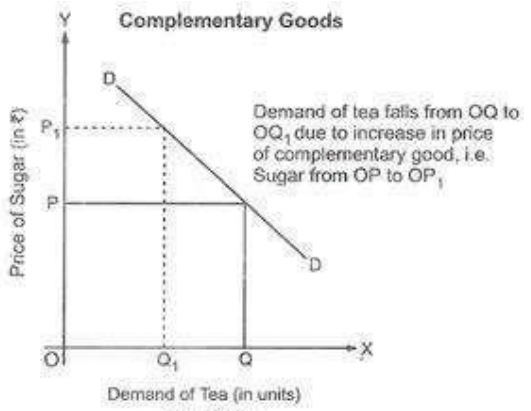


Fig. 3.11

Substitute Goods Vs Complementary Goods

Basis	Substitute Goods	Complementary Goods
Meaning	Substitute goods refers to those goods which can be used in place of one another to satisfy a particular want.	Complementary goods refer to those goods which are used together to satisfy a particular want.
Nature of demand	Substitute goods have competitive demand	Complementary goods have joint demand.
Relation	Price of one substitute good has positive relationship with quantity demanded of another substitute good.	Price of a complementary good has negative relationship with quantity demanded of another Complementary good.
Example	Tea and coffee Coke and Pepsi	Tea and Sugar Car and Petrol

Normal Goods and Inferior Goods

Most of the commodities that we usually buy are normal goods. As a general practice a consumer buys more of such goods, when his income rises and less of it when his income falls. The commodities that follow this rule are called 'Normal Goods'

Normal goods refer to those goods whose demand increases with an increase in income.

For Eg: If the demand for TV increases with a rise in income, then TV will be called a normal good. Income effect is positive in case of normal goods.

Inferior Goods

Inferior goods refers to those goods whose demand decreases with an increase in income. It means, that there exists an inverse relationship between income and the demand for inferior goods. So, income effect in negative in case of inferior goods.

For Eg: If the income of a consumer rises and he prefers to replace his black-and-white TV with a colored one, then demand of B/W TV will fall. In such case, B/W TV is an inferior good.

Normal Goods Vs Inferior Goods

Basis	Normal Goods	Inferior Goods
Meaning	Normal Goods refer to those goods whose demand increases with an increase in income	Inferior goods refer to those goods whose demand decreases with an increase in income.
Income Effect	Income effect is positive in case of normal goods	Income effects in negative in case of inferior goods
Relation	There is a direct relation between income and demand for normal goods	There is an inverse relation between income and demand for inferior goods
Example	"Full Cream Milk" is a normal good if its demand increases with An increase in income	"Toned milk' is an inferior good if its demand decreases With an increase in income.

Change in Quantity Demanded Vs Change in Demand

Basis	Change in Quantity Demand	Change in Demand
Meaning	When the quantity demanded changes due to a change in the price, keeping other factors constant, it is known as change in quantity demanded	When the demand changes due to change in any factor other than the own price of the commodity, it is termed as change in demand
Effect on Demand Curve	It leads to a movement along the same demand either upwards or downwards	It leads to a shift in the demand curve either rightwards or leftwards.
Reason	It occurs due to an increase or a decrease in the price of the given commodity	It occurs due to change in other factors, like change in prices of substitutes, change in prices of complementary goods, change in income, etc.

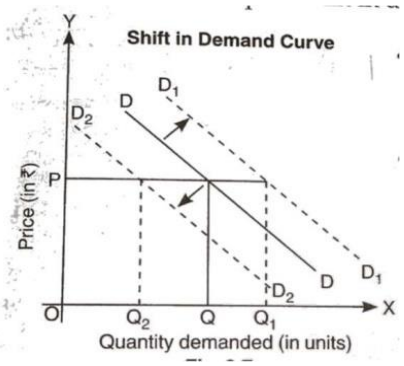
Shift in Demand Curve (Change in Demand)

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 change in demand.

Various Reasons for Shift in Demand Curve

i) Change in price of substitute goods
ii) Change in price of complementary goods
iii) Change in income of consumers
iv) Change in tastes and preferences
v) Expectation of change in price in future
vi) Change in population
vii) Change in distribution of income
viii) Change in season and weather

Let us understand the concept of shift in demand curve with the help of diagram.

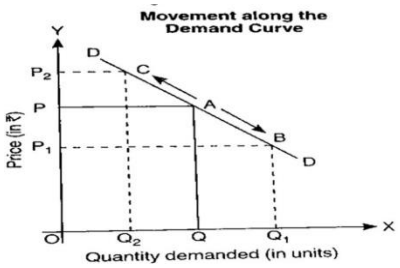
In demand for the commodity is OQ at a price of OP. Change in other factors leads to a rightward or leftward shift in the demand curve: **Rightward shift**: When demand rises from OQ to OQ_1 (known as increase in demand) at the same price of OP, it leads to a rightward shift in demand curve from DD to D_1D_1. **Leftward shift**: On the other hand, fall in demand from OQ to OQ_2 (known as decrease in demand) at the same price of OP, leads to a leftward shift in demand curve from DD to D_2D_2	

Movement Along the Demand Curve (Change in Quantity Demanded)

When quantity demanded of a commodity change due to a 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 a downward movement or an upward movement along the same demand curve. Let us understand the movement along the demand curve.

OQ quantity is demanded at a price of OP. Change is price leads to an upward or downward movement along the same demand curve.

Upward movement: When price rises to OP2, quantity demanded falls to OQ2 leading to an upward movement from A to C along the same demand curve DD. **Downward Movement**: On the other hand, fall in price from OP to OP1 leads to an increase in quantity demanded from OQ to OQ1 resulting in a downward movement from A to B along the same demand curve	

ELASTICITY OF DEMAND

Meaning of Elasticity of Demand- It is defined as the degree of responsiveness of change in the quantity demand of goods due to the change in factors affecting demand such as price, income, and price of related good. We can say it is percentage change in quantity demanded divided by percentage changes in price, income and price of related goods.

$$E_D = \frac{\%\text{change in demand}}{\%\text{Change in determinants of demand}}$$

Price Elasticity of Demand:is defined as the degree of responsiveness of change the quantity demanded of goods due to the change in prices. Price elasticity of demand expresses relationship between change in quality demanded of a commodity and a proportionate change in its price.

It is expressed as

$$e_P = -\frac{Percentage\ change\ in\ quantity\ demanded}{Percentage\ change\ in\ price}$$

$$= -\frac{\%\Delta\ Qd}{\%\Delta\ P}$$

$$= -\frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Where,
e_P = Price elasticity of demand
Q = Original quantity demanded
ΔQ= Change in quantity demanded (Q_1 -Q)
P = Original price
ΔP = Change in price (P_1 -P)

Degree or Types of Price Elasticity-

Price elasticity demand is negative for all goods except for goods (inferior goods) that are exception to the law of demand. Price elasticity between varies 0 & ∞, which will be the respective condition when the goods is completely inelastic or perfectly elastic

(i) Perfectly Elastic Demand (E = ∞)

When demand of a commodity increased or decreases to any extent without any change or only upon a small change in its price, is called perfectly elastic demand. Demand curve under Perfectly elastic demand is horizontal straight line parallel to X axis.

Perfectly Inelastic Demand

When demand of a commodity does not change at all irrespective of any change in price, it is called perfectly inelastic demand. Demand curve under Perfectly Inelastic demand is Vertical straight line parallel to Y axis.

iii]. **Unitary Elastic Demand**

Price elasticity of Demand is unity when the Percentage change in demand is exactly equal to the percentage change in price. For eg.- If on 10% increase in the price of a commodity, demand decrease 10%, it will be called unity elastic. Eg. Commodities like cars, fashion items.

Iv] Highly Elastic or Elastic Demand

When the proportionate change in demand of a quantity is more than the proportionate change in its price than the demand for goods will consider as elastic demand.

v] Inelastic Demand or Relative Inelastic Demand

E<1

When proportionate change in the demand of a commodity is less than proportionate change in price than the demand for goods will consider as inelastic demand.

easurement of Price Elasticity of Demand

1. Percentage Method

In this method price elasticity of demand is measured by the ratio of percentage change in quantity demanded divided by the percentage change in price of a commodity.

Formula for calculating elasticity of demand (ed=)

$$\frac{\text{Percentage Change in Quantity Demanded}}{\text{Percentage Change in Price}}$$

$$=(-)\ \frac{\dfrac{\text{Change in Demand }(\Delta Q)}{\text{Initial Demand }(Q)}\times 100}{\dfrac{\text{Change in Price }(\Delta P)}{\text{Initial Price }(P)}\times 100}$$

$$e_D=(-)\ \frac{\Delta Q}{Q}\times\frac{P}{\Delta P}=(-)\frac{P}{Q}\times\frac{\Delta Q}{\Delta P}$$

2. Total outlay or Expenditure Method-

According to this method the elasticity of demand is measured by considering the change in total outlay as are result of change in price of the commodity. In this method we compare the total expenditure before and after the price change and there we find the elasticity of demand.
Total Outlay= Quantity purchased * Price of commodity
There are three cases
Case 1: Elastic Demand (ed >1)
When there is negative relationship between change in price and change in expenditure. It means increase (decrease) in price leads to decrease (increase) in expenditure than the elasticity of demand is elastic.
Case 2: Inelastic Demand (ed <1)
When there is positive relationship between change in price and change in expenditure. It ssmeans increase (decrease) in price leads to increase (decrease) in expenditure than the elasticity of demand is Inelastic.
Case 3: Unitary Demand (ed =1)

When there is no change in Total expenditure with the change in price. It means increase or decrease in price doesn't lead any change in total expenditure.

Price per Unit	Demand (Unit)	Total Expenditure	Comments
7	6	42	Position before change in price
6	10	60	E_d**>1**

6	5	30	E_d**<1**
6	7	42	E_d**=1**

Question Bank

Multiple choice question (1 Mark question)

1) **Demand for a commodity refers to:**
a) Desire for the commodity
b) Need for the commodity
c) Stock of the commodity with the seller
d) Quantity of the commodity demanded at a certain price during a given time

2) **Which of the following is not a factor affecting demand?**
a) Price of the commodity b) Price of related goods
c) Population d) Supply of the good
3) **If income increases and demand for good X decreases, good X is a:**
a) Normal good b) Luxury good c) Inferior good d) Complementary good

4) **Which of the following best represents a demand function**?
a) Qd = f(Supply, Price) b) Qd = f(Price of the commodity)
c) Qd = f(P, Y, Pr, T) d) Qd = P × Q
5) **Law of Demand shows the relationship between:**
a) Price and quantity demanded b) Income and quantity demanded
c) Price and supply d) Demand and utility
6**) When demand increases due to factors other than price, it is called:**
a) Extension of demand b) Contraction of demand c) Increase in demand d) Decrease in quantity demanded
7**) Movement along the demand curve represents:**
a) Increase or decrease in demand b) Change in demand c) Change in quantity demanded
d) No change in demand
8) **In the Law of Demand, "Ceteris Paribus" is applied to:**
a) Only price of the commodity b) Only quantity demanded c) All factors except price
d) None of the above
9) **Price elasticity of demand measures:**
a) The responsiveness of price to quantity demanded b) The responsiveness of quantity demanded to a change in price c) The change in price due to change in supply d) None of the above
10)**If the percentage change in quantity demanded is greater than the percentage change in price, demand is:**
a) Perfectly elastic b) Unit elastic c) Relatively elastic d) Relatively inelastic

Question	Answer
1	D Quantity of the commodity demanded at a certain price during a given time
2	D Supply of the good
3	c Inferior good
4	c Qd = f(P, Y, Pr, T)
5	a Price and quantity demanded
6	D Decrease in quantity demanded

7	C Change in quantity demanded
8	C All factors except price
9	B The responsiveness of quantity demanded to a change in price
10	C Relatively elastic

ASSERTION REASON BASED QUESTION
Choose the correct option for question 21 to 30

a) Both A and R are true, and R is the correct explanation of A

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

c) A is true, but R is false

d) A is false, but R is true

11) Assertion (A): When the price of a good increases, its demand increases.

Reason (R): There is an inverse relationship between price and quantity demanded.

12) Assertion (A): A rise in the price of tea leads to a fall in demand for coffee.
Reason (R): Tea and coffee are complementary goods.

13) **Assertion (A):** An increase in consumer income always leads to an increase in demand
Reason (R): All goods are normal goods

14)Assertion(A): The demand curve slopes downward.
Reason (R): As price falls, quantity demanded increases due to the law of diminishing marginal utility.

15) 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.

16) 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.

17) Assertion (A): Complementary goods have joint demand.

Reason (R): Complementary goods are demanded simultaneously to satisfy a particular want

18) Assertion (A): Price demand curve is negatively slowed

Reason (R): law of demand States inverse relation between price and demand. Keeping other factors constant.

19). 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

20) **Assertion (A):** The demand for luxury cars is highly elastic.

Reason (R): Luxury cars are non-essential and have several substitutes within the premium segment.

Question	Answer
21	D
22	C
23	B
24	A
25	B
26	A
27	A
28	A
29	B
30	A

STAEMENTMENT BASED QUESTION

Read the following statements carefully. Choose the correct option:

a) **Both Statement I and II are correct**
b) **Both Statement I and II are incorrect**
c) **Statement I is correct but Statement II is false**
d) **Statement I is false but Statement II is correct**

31) Statement I: Law of Demand states that when the price of a good rises, its quantity demanded falls, ceteris paribus.

Statement II: Ceteris Paribus means that all other factors affecting demand are also changing.

32) Statement I: Law of Demand holds true only when factors like income, tastes, and preferences remain constant.

Statement II: The Law of Demand does not apply to Giffen goods.

33) Statement I: A rightward shift in the demand curve represents a decrease in demand.

Statement II: A change in price causes movement along the same demand curve.

34) Statement I: Demand increases only when the price of the good falls.

Statement II: Change in demand can also occur due to change in consumer income or tastes.

35)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

36)**Statement I** : availability of substitutes makes demand less elastic

Statement II: Substitute goods have less elastic in demand.

37)**Statement I** : 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.

38)**Statement 1**: Slope of the demand curve and the elasticity of demand are different concepts
Statement II: Slope of a demand curve is equal to ΔP / ΔQ.

39) **Statement I** : Change in quantity demanded is the explanation of law of demand.
Statement II: Demand for a luxury good is elastic

40)) Statement **I** : Flatter demand curve is more elastic at point of intersection.
Statement II: Demand for a commodity with a large number of substitutes is more elastic

Question	Answer
31	C
32	A
33	D
34	A
35	B
36	B
37	A
38	B
39	A
40	A

42. **From the set of statements given in column I and column II choose the incorrect 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

(a) A – (i) (b) B – (ii) C – (iii) D – (iv)

Question	Answer
41	B
42	C

CASE BASED QUESTION
Read the given cases carefully and answer the question on the basis of the same
(A) Ravi notices that when the price of apples falls from Rs 100/kg to Rs 80/kg, he starts buying 2 kg instead of 1.5 kg. However, when his income increases, he starts buying 3 kg at Rs 100/kg itself.
1. **What type of change occurred when Ravi increased his apple purchase due to fall in price?**
a) Increase in demand
b) Decrease in demand
c) Extension of demand

d) Contraction of demand

2. What type of change occurred when Ravi increased his purchase at the same price due to increase in income?

a) Change in quantity demanded
b) Extension of demand
c) Change in demand
d) No change in demand

Answers: 1. (d) 2. (c)

(B) **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 II:** 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
(d) 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)

(C) Read the given cases carefully and answer the question on the basis of the same

D-Mart, a leading retail chain, noticed that the sales of its packaged fruit juices were falling. After conducting a survey, the company found that customers were switching to local juice vendors due to high prices. In response, D-Mart reduced the price of its 1-litre fruit juice pack from Rs100 to Rs80. After this price change, the quantity demanded increased from 1,000 units to 1,600 units per week. The marketing team wanted to understand whether the demand for the product is elastic or inelastic to plan future pricing strategies.

1. What was the percentage change in quantity demanded after the price fall?
A. 40% B. 60% C. 20% D. 80%
2. What was the percentage change in price?
A. 10% B. 20% C. 25% D. 15%
3. The price elasticity of demand for D-Mart's fruit juice is:
A. 0.5 B. 1 C. 3 D. 2
4. Based on the elasticity value, the demand for fruit juice is:
A. Elastic B. Inelastic C. Perfectly inelastic D. Unitary elastic
Answers: 1. (b) 2. (b) 3. (c) 4 (a)

LONG ANSWER BASED QUESTION

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.
4. Differentiate between change in Quantity Demand and Change in Demand. Ref: content given above

Application questions

1. Price of the commodity increases from Rs 10 to Rs 12 per unit and expenditure on the commodity increases by 20% find elasticity. Give logical support to our answer.
2. At Price Rs 4, the demand for the good is 25 units. Suppose the price of the good increases to Rs5 and the demand for the good falls to 20 units. Calculate the price elasticity
3. The demand curve of a commodity is expressed as D_x=40 -5P. If slope of the demand curve is given to be (-2), calculate price elasticity of demand for the commodity when demand is 20 units.
(Hint .E_d= (-) 0.25)
4. A Consumer Spends Rs 80 on a commodity when its price is Rs 1 per unit and Spends Rs 96 when its price is Rs 2 per unit. Calculate Price elasticity for the commodity by the Percentage method .
(Hint .E_d= (-) 0.4)

PRODUCER BEHAVIOUR AND SUPPLY

Production: Combining inputs in order to get the output is production.

Production Function: It is the functional relationship between inputs and output in the given state of technology.

Q= f (L, K)

Q is the output, L: Labour, K: Capital

Fixed factor: the factor whose quantity remains fixed with the level of output.

Variable factor: those inputs which change with the level of output.

Capital	Labour	Output
10	1	50
10	2	70
10	3	82

10	4	92
10	5	100

Here units of capital used remain the same for all levels of output. Hence it is a fixed factor. Amount of labour increases as output increases. Hence it is a variable factor.

PRODUCTION FUNCTION AND TIME PERIOD

Market period: is that period where supply / output cannot be altered or changed.

Short period/ run: is the period that supply/output can be altered /changed by changing only variable factors of production. In other words, fixed factors of production remain fixed.

Long period: is that period where all factors of production are changed to bring about changes in output/ supply. No factor is fixed.

Difference between short run and long run:

Basis	Short run	Long run
Meaning	Only variable factors are changed	All factors are changed
Price determination	Demand is active	Both demand and supply play an important role
Classification	Factors are classified as fixed and variable.	All factors are variable.

CONCEPT OF PRODUCT: Refers to volume of goods produced by a firm or an industry during a specific period of time.

TOTAL PRODUCT: Total quantity of goods produced by a firm /industry during a given period of time with given number of inputs.

- Average product =output per unit of variable input.
- APP= TPP/ units of variable factor.
- Average product is also known as average physical product.

MARGINAL PRODUCT(MP): refers to addition to the total product, when one more unit of variable factor is employed.

- MPn=TPn - TPn-1
- MPn=Marginal product of n'th Unit of variable factor.
  TPn=Total product of n units of variable factor.
- TPn-1=Total product of (n-1)Unit of variable
- factor. n= number of units of variable factor.
- MP= ΔTP/ Δ

We derive TP by summing up MP, i.e., TP= ∑MP.

LAW OF VARIABLE PROPORTION OR RETURNS TO A VARIABLE FACTOR:

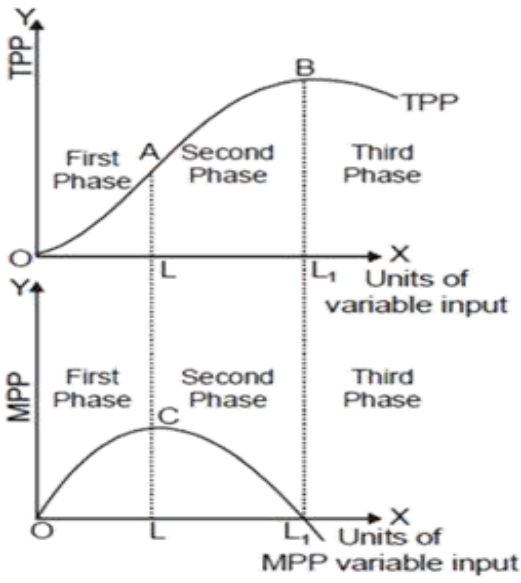
Statement of law of variable proportion: In Short period, when only one variable factor is increased, keeping other factors constant, the total product (TP) initially increases at an increasing rate, then increases at a decreasing rate and finally TP decreases.

MPP Initially increases then falls but remains positive then 3rd phase becomes negative. Explanation of law of variable proportion with a schedule and a diagram.

Schedule of law of variable proportion

Fixed factor	Variable factor	Total product	Marginal product	Phase
Land In acres	Labour	units	Units	
1	0	0	-	I-Increasing returns to a factor
1	1	5	5	
1	2	15	10	
1	3	30	15	
1	4	40	10	II- Diminishing returns to a factor
1	5	45	5	
1	6	45	0	
1	7	40	-5	III- Negative returns to a factor

Diagram:



Phase I / Stage I / Increasing returns to a factor

I. TPP Increases at an increasing rate.

II. MPP Also increases.

Phase II / Stage II/ Diminishing returns to a factor.

I. TPP increases at decreasing rate

II. MPP decreases/ Falls

III. This phase ends when MPP is zero and TPP is maximum.

Phase III / Stage III / Negative returns to a factor

I. diminishes / decreases

II. MPP becomes negative.

Reasons for increasing returns to a factor.

I. Better utilisation of fixed factors.

II. Increase in efficiency of variable factor.

III. Optimum combination of factor.

Reasons for diminishing returns to a factor

I.Indivisibility of factor.

II. Imperfect substitutes.

Reason for negative returns to a factor

Limitation of fixed factors.

Poor coordination between variable and fixed factors.

Decrease in efficiency of variable factors.

Relation between MPP and TPP

I. As long as MPP increases, TPP increase at an increasing rate.

II. When MPP decreases, TPP increases diminishing rate.

III. When MPP is Zero , TPP is maximum.

IV. When MPP is negative , TPP starts decreasing.

HOTS

Giving reasons, state whether the following statements are true or false:

1-When there are diminishing returns to a factor, total product always decreases.

Ans. False, when there is diminishing returns to a factor, TPP increases at a decreasing rate.

2-TPP increases only when MPP increases.

Ans. False. TPP also increases when MPP decreases but remains positive.

3-Increase in TPP always indicates that there are increase in returns to a factor. Ans. False. TPP increases even when there are diminishing returns to a factor

4-When there are diminishing returns to a factor marginal and total products always fall

Ans. False. Only MPP falls, not TPP. In case of diminishing returns to a factor, TPP increases at diminishing rate.

1) Calculate MP for the following

Variable factor unit	0	1	2	3	4	5	6
TP (unit)	0	5	13	23	28	28	24

Ans: MP: 0 5 8 10 5 0 -4

SHORT ANSWERS QUESTIONS AND LONG ANSWER

1. Explain the concept of a production function.

2. What is the total product of an input?

3. What is the average product of an input?

4. What is the marginal product of an input?

5. Explain the relationship between the marginal products and the total product of an input.

6. Explain the concepts of the short run and the long run.

7. What is the law of diminishing marginal product?

8. What is the law of variable proportions?

9. When does a production function satisfy constant returns to scale?

10. When does a production function satisfy increasing returns to scale?

2. COSTS

Meaning of Cost: Cost refers to the expenditure incurred by a producer on the factor as well as non –factor inputs for a given output of a commodity.

In **Economics**, cost is the sum of explicit cost and implicit cost.

Cost= Explicit Cost + Implicit Cost

Explicit Cost: Actual payment made to outsiders on hired factors of production.

For Example: wages paid to the employees, rent paid for hired premises, payment for raw materials, etc.

Implicit Cost: Cost incurred on the self-owned factors of production. For Example: interest on own capital, rent of own building, salary for the services of entrepreneur, etc.

Opportunity Cost: It is the cost of next best alternative forgone/sacrificed.

Money Cost: Money expenses incurred by a firm for producing a commodity or service.

SHORT RUN COSTS:

In short run, there are some factors which are fixed, while others are variable. Hence, these are divided into **two kinds** of costs.

(i) Total Fixed Cost (TFC)

(ii) Total Variable Cost (TVC)

Total Cost (TC) = TFC+ TVC

Total Fixed Cost (TFC) or Fixed Cost (FC):

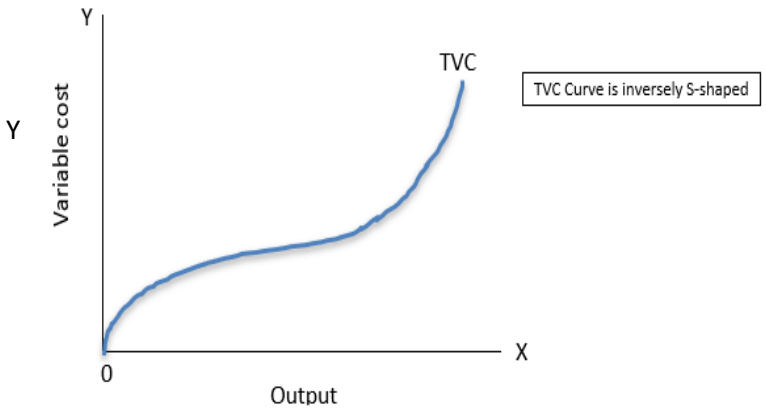
Fixed Cost refers to the cost, which are incurred on the fixed factors of production. These costs remain fixed whatever may be the scale of output. These costs are present even when the output is zero. It is present in short run but disappear in the long run.

Output	0	1	2	3	4	5
	10	10	10	10	10	10

Total Variable Cost (TVC) or Variable Cost (VC):

It refers to those costs, which vary directly with the variation in the output. These costs are incurred on the variable factors of production. It is also called as prime cost, direct cost or avoidable cost. These costs are zero when output is zero.

Output	0	1	2	3	4	5
TVC	0	10	16	25	38	55

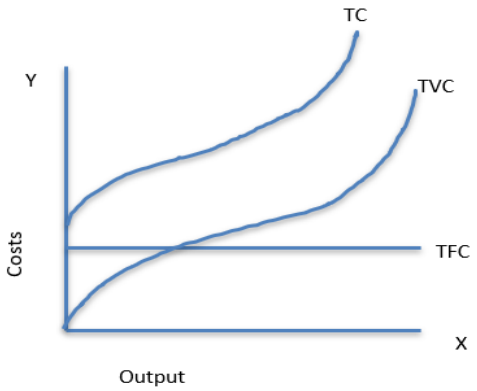


Difference Between TVC and TFC

BASIS	TVC	TFC
Meaning	Vary directly with the level of output.	Do not vary with the level of output.
Time period	It can be changed in short period.	It cannot be changed in short period.
Cost at zero output	It is zero when there is no production.	It can never be zero even if there is no production.
Factors of Production	It is incurred on variable factors like labour, raw material, etc.	It is incurred on fixed factors like land building, etc.
Shape of the cost curve	Inversely S-shaped.	Horizontal straight line parallel to X-axis.

Total Cost (TC): The sum total of expenditure incurred by a producer on the factor as well as non-factor inputs for a given output of a commodity.

Output (Units)	TFC (in RS)	TVC (in RS)	TC (in RS)=TFC+TVC
0	12	0	12
1	12	6	18
2	12	10	22
3	12	15	27
4	12	24	36
5	12	35	47



Relationship between TC, TFC and TVC:

1. Total Cost never be zero, even when the level of output is zero, because fixed cost is positive and constant at zero level of output.
2. As the level of **output increases, total cost also increases** due to increase in variable cost.
3. TFC is horizontal to X-axis.
4. TC and TVC are inversely S-shaped (they rise initially at a decreasing rate, then at a constant rate and finally at an increasing rate) due to law of variable proportions.
5. At zero level of output TC is equal to TFC.
6. TC and TVC curves are parallel to each other.

AVERAGE COST (AVERAGE TOTAL COST): Average cost is the cost per unit of output produced.

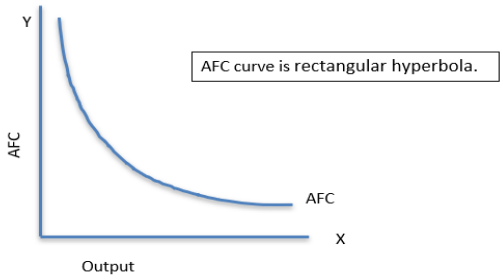
ATC= TC / Q or AC= AFC+AVC

Average Fixed Cost (AFC): It refers to per unit fixed cost of production.

AFC= TFC/ Q

AFC declines with every increase in output. It is a rectangular hyperbola. It goes very close to X-axis but never touches X-axis, as TFC can never be zero.

Output (Q)(in units)	TFC	AFC = TFC /Q
0	12	-
1	12	12
2	12	6
3	12	4
4	12	3
5	12	2.40

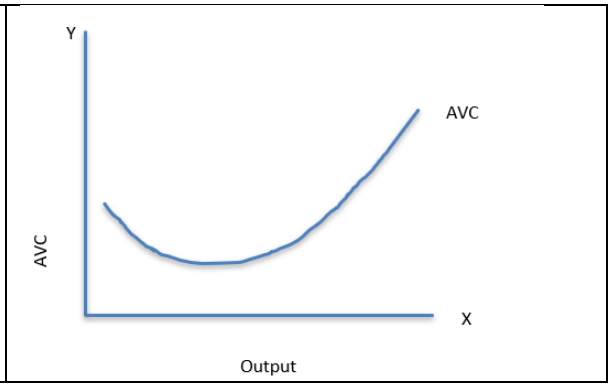


Average Variable Cost (AVC): It is the cost per unit of the variable cost of production.

AVC=TVC/Q

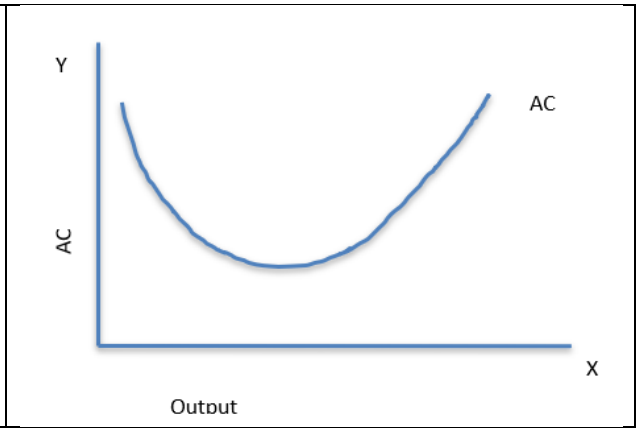
AVC initially falls with increase in output. Once the output rises till optimum level, AVC starts rising.

Output (Q) in units	TVC	AVC=TVC/Q
0	0	-
1	6	6
2	10	5
3	15	5
4	24	6
5	35	7



A**verage Total Costs or Average cost (ATC or AC):** Average cost refers to the per unit total cost of production.

Output (Q) in units	AFC	AVC	AC=AFC+AVC
0	-	-	-
1	12	6	18
2	6	5	11
3	4	5	9
4	3	6	9
5	2.40	7	9.40



Phases of AC:

I Phase: When both AFC and AVC fall, AC also falls.

II Phase: When AFC continues to fall , AVC remaining constant AC falls till it reaches minimum.

III Phase: AC rises when rise in AVC is more than fall in AFC.

Important Observations of AC, AVC & AFC:

1. AC curve always lie above AVC (because AC includes AVC & AFC at all levels of output).
2. AVC reaches its minimum point at an output level lower than the that of AC because when AVC is at its minimum, AC is still falling because of fall in AFC.
3. As output increases, the gap between AC &AVC curves decreases but they never intersect.

MARGINAL COST (MC): It is the addition to total cost when one more unit of output is produced.

$$MC_n = TC_n - TC_{n-1}$$

MC is not affected by TFC.

Output (Q)	TVC	TFC	TC	MC= $TC_n - TC_{n-1}$
0	0	12	12	-
1	6	12	18	6
2	10	12	22	4
3	15	12	27	5
4	24	12	36	9
5	35	12	47	11

Relationship between AC, AVC & MC:

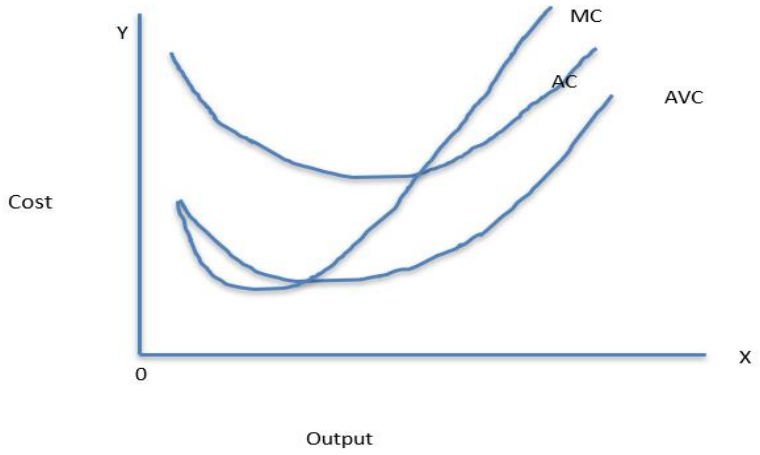
1. When AC & AVC declines, MC declines faster than AC & AVC. So that MC curve remain below AC & AVC.

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 AC and AVC. So that MC starts rising AC and AVC is falling.

5.MC must cut AC & AVC from its lowest point.



Relationship between TC and MC:

1. When MC is falling, TC / TVC increases at a diminishing rate.

2. When MC is minimum, TC / TVC stops increasing at a diminishing rate.

3. When MC is rising, TC / TVC increases at an increasing rate.

QUESTIONS:

MCQs:

Q1. Total Cost at zero level of output will be:

a. TFC b. TVC c. AC d. AFC

Q2.When MC curve cuts AC curve:

a. AC=MC b. AC<MC c. AC>MC d. both AC & MC are falling

Q3. Wages paid to labourers is an example of:

a. Explicit cost b. implicit cost c. Opportunity cost d. none of these

Q4. Average Fixed cost is indicated by:

a. rectangular hyperbola b. A straight line parallel to X-axis

c. A straight line parallel to Y-axis d. U-shaped curve.

Q5. AC, AVC, & MC curves are U –shaped because of:

a. Law of diminishing marginal utility b. Law of Variable proportions

c. Law of diminishing return d. none of these

ASSERTIONS AND REASONINGS:

Q6. Assertions (A): TVC is an upward sloping curve (inverted S-shaped).
Reasoning (R): Variable Cost changes with change in the level of output.
Alternatives:

a. Both A and R are true and R is the correct explanation of point A.
b. Both A and R are true but R is not the correct explanation of point A.
c. A is true but R is false.
d. A is false but R is true.

Q7. **Assertions (A):** AFC is a U- shaped curve.
Reasoning (R): AFC= TFC/ Q

a. Both A and R are true and R is the correct explanation of point A.
b. Both A and R are true but R is not the correct explanation of point A.
c. A is true but R is false.
d. A is false but R is true.

3.REVENUE

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

Revenue: It refers to money receipts of a firm from selling its output or total sale receipts or receipts from the sale of given output.

1) Total Revenue: The revenue that a firm gets by selling a given quantity of the product.

Total Revenue (TR) = P x Q or TR = Quantity sold x price (or) output sold x price, also ∑MR.

2) Average Revenue: It is the per unit quantity sold. Average Revenue (AR) = TR / Q or Revenue or receipt received from per unit of output sold. AR = TR/Output sold. AR and price are the same. That is, AR = price

AR and demand curve are the same for a firm.AR Shows the various quantities demanded at various prices.

3) Marginal Revenue = ΔTR /ΔQ or $MR_n = TR_n - TR_n\text{-}1$ [MR is an addition to TR].

Additional revenue earned by the seller from selling an additional unit of output.

Tabular Representation of TR, AR and MR:

Output	AR(Rs)	MR(Rs)	TR(Rs)
0	0	0	0
1	10	10	10
2	9	8	18
3	8	6	24
4	7	4	28
5	6	2	30
6	5	0	30
7	**4**	**-2**	**28**

Relationship between AR and MR (when price remains constant or in perfect competition): - Under perfect competition, the sellers are price takers. Single price prevails in the market. Since all the goods are homogeneous and are sold at the same price AR = MR. As a result, AR

and MR curve will be horizontal straight line parallel to OX axis. **(When price is constant or in perfect competition)**

Relation between TR and MR (When price remains constant or in perfect competition): -

When there exists single price, the seller can sell any quantity at that price, the total revenue increases at a constant rate (MR is horizontal to X axis)

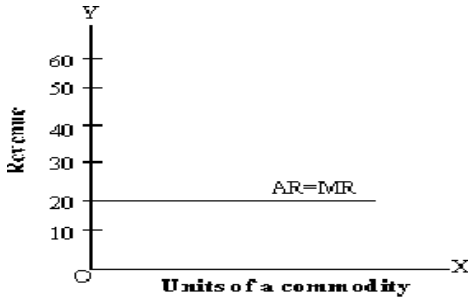
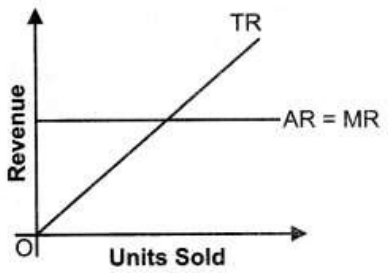


Fig. 4.12

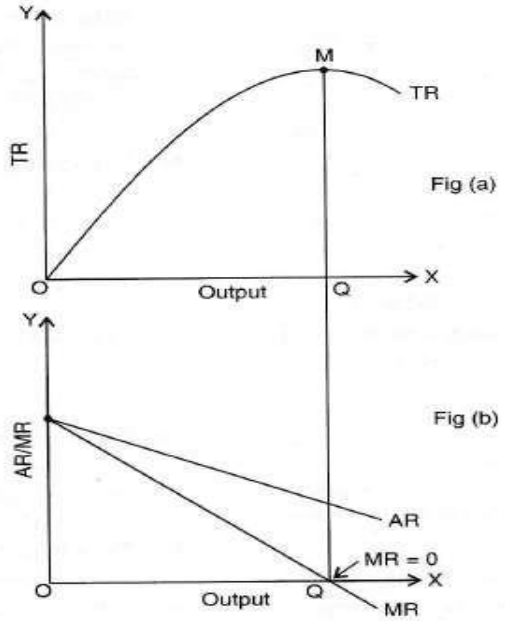


Relationships between AR and MR under monopoly and monopolistic competition (Price changes or under imperfect competition): -

- AR and MR curves will be downward sloping in both the market forms.
- AR lies above MR.
- AR can never be negative.
- AR curve is less elastic in monopoly market form because of no substitutes.
- AR curve is more elastic in monopolistic market because of the presence of substitutes.

Relationship between TR and MR. (When price falls with the increase in sale of output): -

- Under imperfect market AR will be downward sloping – which shows that more units can be sold only at a less price.
- MR falls with every fall in AR / price and lies below AR curve.
- TR increases as long as MR is positive.
- TR falls when MR is negative.
- TR will be maximum when MR is zero.



FORMULAE AT A GLANCE:

TR=Price or AR X Output sold, or TR=∑MR,

AR(price)=TR÷units sold and

MRn=TRn-TRn-1

Multiple Choice Questions:

1. Price of a commodity is:
   (a) TR (b) MR (c) AR (d) None of these
2. MR curve is parallel to X-axis because:
   (a) Price falls (b) Price rises (c) Price fluctuates (d) Price remains uniform
3. As long as MR is positive, TR:
   (a) Decreases (b) Increases (c) Remains constant (d) None of these
4. When a firm sells more at the uniform price, TR:
   (a) Increases at falling rate (b) Increases at rising rate (c) Increases at constant rate (d) None of these
5. When MR rises, TR rises at ……. rate.
   (a) Falling (b) Increasing (c) Constant (d) All of these
6. When 5 units of a good are sold, TR is Rs.100. When 6 units are sold, MR is Rs.8. At what price are 6 units sold?
   (a) Rs.28 per unit (b) Rs.20 per unit (c) Rs.18 per unit (d) Rs.12 per unit
7. AR and Price are always equal under:
   (a) Perfect competition only (b) Monopolistic competition only (c) Monopoly only (d) All market forms
8. In which form of market is the demand of a firm perfectly elastic?
   (a) Monopoly (b) Perfect competition (c) Monopolistic competition (d) Oligopoly
9. When output increases from 70 units to 90 units,TR rises from Rs.7000 to Rs.8000. MR at 90 units will be …
   (a) 60 (b) 50 (c) 45 (d) 1000
10. When MR ……. ,TR increases at constant rate.
    (a) Rises (b) Falls (c) Remains constant (d) None of these

Answer of MCQs: 1.(c),2.(d),3.(b),4.(c),5.(b),6.(c),7.(d),8.(b),9.(b) and 10.(c)

1. Producer's Equilibrium

A producer / firm is said to be in equilibrium when he gets maximum production with given level of inputs. A firm's profit is defined as TR -TC. When this difference is maximum, firm is in equilibrium.

This is explained through two approaches:

1. TR and TC approach and 2. MR and MC approach

MR and MC approach: This is a mathematical derivation from TR and TC approach (as $MR_n = TR_n - TR_{n-1}$ and $MC_n = TC_n - TC_{n-1}$). In perfect competition, price of the commodity remains constant. Price or AR remains the same at all levels of output. The revenue from additional unit (MR) is equal to AR. The conditions to determine producer's equilibrium: Producer aims to produce that level of output at which:

(i) MC is equal to MR(MC=MR)

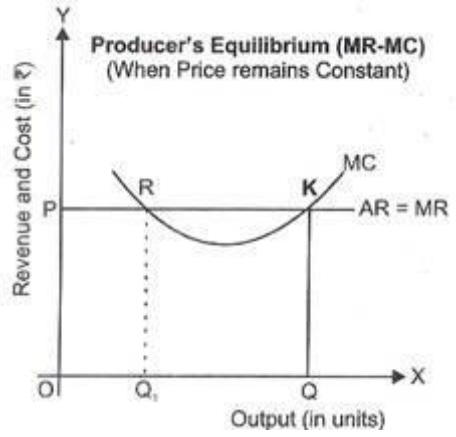
(ii) MC is greater than MR, after MC=MR output level. (It implies that profits will fall after MC=MR output level.)

Equilibrium of a producer through the "Tabular Presentation":

Price (Rs)	Output (Units)	TR (Rs)	TC (Rs	MC (Rs)	MR (Rs)	Profit (TR-TC)	Analysis
10	1	10	10	10	10	0	MC=MR
10	2	20	18	8	10	2	MC<MR
10	3	30	24	6	10	6	MC<MR
10	4	40	34	10	10	6	Equilibrium
10	5	50	46	12	10	4	MC>MR

MR and MC approach -In general a firm's profit maximizing condition is MR = MC, But for a competitive firm.

P = MC (Because in perfect competition P = AR = MR) and MC is rising curve.



(Competitive firm chooses its level of output in the rising portion of MC)

Multiple Choice Questions:

1. Producer's equilibrium is determined where:

(a) MR>MC (b) MR<MC (c) MR=MC (d) All of these.

2. A firm earns normal profit when:

(a) AR=AC (b) AR>AC (c) AR<AC (d) None of these

3. At the point of equilibrium MC should be:

(a) Rising (b) Falling (c) Constant (d) All of these.

4. A producer aims to produce that level of output at which:

(a) MR=MC (b) MC>MR after MC=MR (c) Both (a) and (b) (d) Neither (a) nor (b).

5. In perfect competition, a firm achieves equilibrium when:

(a) MC=MR (b) MC>MR (c) MC is rising when it cuts MR (d) All of these.

Answer of MCQs: 1. (c),2. (a),3. (a),4. (c) and 5. (d)

SUPPLY

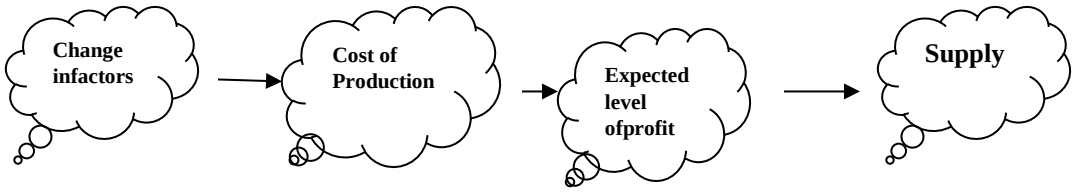
Supply: supply refers to quantity of a commodity that a firm is willing and able to offer for sale at a given period of time.

MARKET SUPPLY :- Market supply is the total quantity of a good that all sellers in the market are willing to sell at various prices during a given period of time.

Formula: Market Supply = Supply by Firm A + Supply by Firm B + ...

Determinants of Supply*:*

Change in factors → cost of Production → expected level of profit → supply



- **Prices of the goods-**When price of the goods increases then supply increases. Similarly, when price of the goods decreases then supply also decreases. Because with increase in price the expected level of profit increases and with fall in price the expected level of profit decreases.

- **Prices of other goods**: Increase in the price of other goods makes them more profitable in comparison to the given commodity. As a result, the firm produces more of other goods and supplies more of other goods.
- **Prices of factors of production (inputs**): When price of the inputs increase then cost of production increases and expected level of profit decreases which leads to decrease in supply. When price of the inputs decreases then cost of production decreases and expected level of profit increases which leads to increase in supply.
- **State of Technology**: Technological changes influence the supply of a commodity. Advanced and improved technology increases production hence supply increases.

- **Government policy (Taxation Policy)**: Increase in taxes raises the cost of production and reduce the expected level of profit and, thus, reduces the supply.

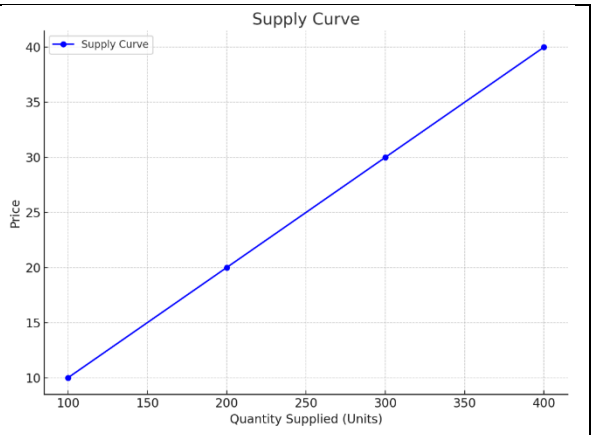
SUPPLY FUNCTION

Supply function shows the functional relationship between quantity supplied for a particular commodity and the factors influencing it.

SUPPLY SCHEDULE

Supply schedule is a tabular statement showing various quantities of a commodity being supplied at a various level of price, during a given period of time.

PRICE	QUANTITY SUPPLIED(UNITS)
10	100
20	200
30	300
40	400



Supply curve refers to a graphical representation of supply schedule.

Here is the supply curve based on supply schedule. As shown, the curve slopes upward, indicating a direct relationship between price and quantity supplied—higher prices lead to a greater quantity supplied.

Law of supply

Law of supply states the direct relationship between price and quantity supplied, keeping other factors constant (ceteris paribus).

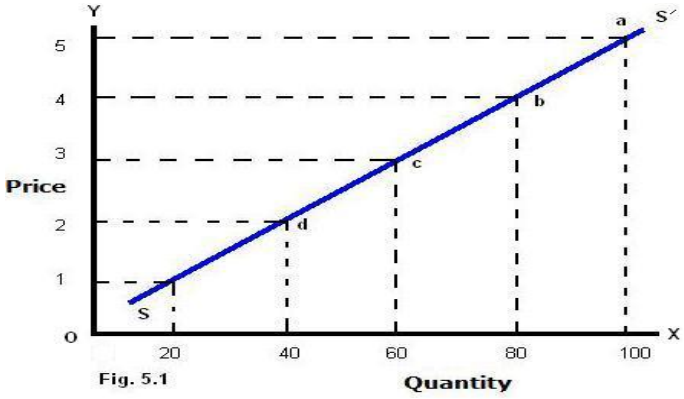


Fig. 5.1

Price	Quantity
1	20
2	40

Movement along the supply curve (change in quantity supplied)

When quantity supplied of a commodity changes due to change in its own price, keeping other factors constant, it is known as 'change in quantity supplied'.

Expansion in supply refers to a rise in the quantity supplied due to increase in price of the commodity, other factors remaining constant.

Contraction in supply: Contraction in supply refers to a fall in the quantity supplied due to decrease in price of the commodity, other factors remaining constant.

SHIFT IN SUPPLY CURVE (CHANGE IN SUPPLY)

It refers to the situation when quantity supply changes with the change in other factors other than price of the commodity.

Increase in Supply-It refers to the situation when quantity supply increases due to the change in other factors other than price of the commodity. It causes supply curve to shift to right.

Decrease in Supply- It refers to the situation when quantity supply decreases due to the change in other factors other than price of the commodity. It causes supply curve to shift to left.

PRICE ELASTICITY OF SUPPLY

Price Elasticity of Supply is the ratio of percentage change in quantity supply to percentage change in price.

$$Es = \frac{\%\ Change\ in\ Quantity\ Supply}{\%\ Change\ in\ Price}$$

$$OR, \qquad Es = \frac{\Delta Q}{\Delta P} x \frac{P}{Q}$$

T**ypes of Price Elasticity of Supply:**

- **Perfectly elastic supply.** When the supply of a commodity rises or falls to any extent, without any change in its price, the supply of the commodity is said to be perfectly elastic. $e_s = \infty$.
- **Perfectly inelastic supply**. When the supply of as commodity does not change as a result of change in its price, the supply is said to be perfectly inelastic. $e_s=0$.
- **Elastic supply(more than elastic supply)**. When the percentage change in quantity supplied is more than the percentage change in price, then the supply is said to be elastic. $e_s>1$.
- **Inelastic supply**.(Less than Unit elastic) When the percentage change in quantity supplied is less than the percentage change in price,then the supply is said to be inelastic. $e_s<1$.
- **Unit elastic supply.** When the percentage change in quantity supplied is equal to the percentage change in price, then the supply is said to be unit elastic. $e_s=1$.

MEASUREMENT OF PRICE ELASTICITY OF SUPPLY: PERCENTAGE METHOD

Definition of Price Elasticity of Supply (PES):

Price Elasticity of Supply refers to the responsiveness of **quantity supplied** of a commodity to a change in its **price**.

Percentage Method:

This method measures elasticity by calculating the **percentage change in quantity supplied** divided by the **percentage change in price**.

Formula:

PES=%Change in Price/%Change in Quantity Supplied

Or,

PES=ΔQ/ΔP×P/Q

Where:

- **ΔQ = Change in Quantity Supplied**
- **ΔP = Change in Price**
- **P = Original Price**
- **Q = Original Quantity Supplied**

Summary of Interpretation:

PES Value	Nature of Supply
PES > 1	Elastic Supply
PES = 1	Unitary Elastic Supply
PES < 1	Inelastic Supply
PES = 0	Perfectly Inelastic
PES = ∞	Perfectly Elastic

UNIT-7: 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

LARGE NUMBER OF BUYERS AND SELLERS –

- As there are large number of sellers' individual seller cannot influence market supply or price. Similarly, one buyer cannot affect market demand or price.
- Firms become price takers as they have to accept the equilibrium price that market demand & supply decide. So, market or industry is price maker.
- 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.

HOMOGENEOUS PRODUCT –

- Perfect competition market has homogenous goods which are same in shape, size, colour, price etc.
- So, it is easy for new firms to enter into and exit from the market.
- There is no selling cost as there is no need for advertising the good.
- It ensures uniform price in the market

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.

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.

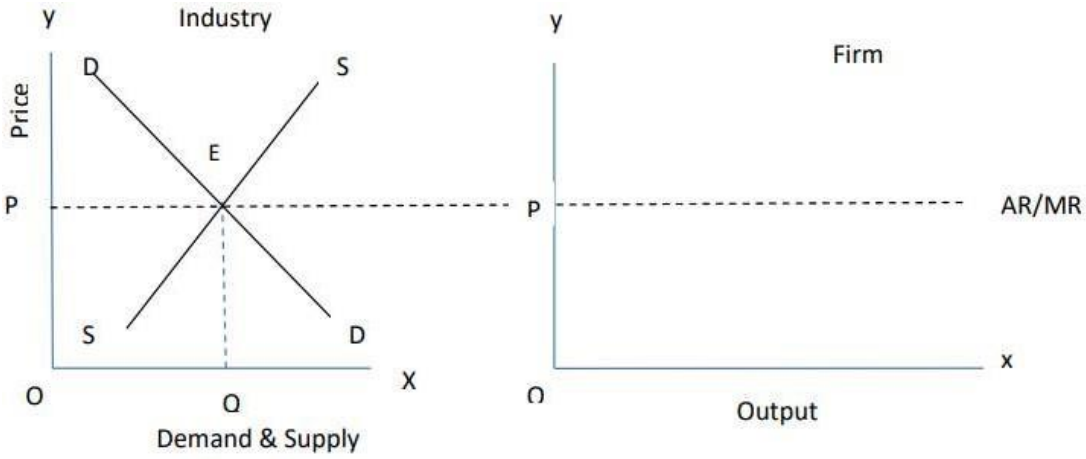
PERFECT MOBILITY OF FACTORS OF PRODUCTION – There is no Geographical or occupational r restriction on their movement. The factors are free to move to the industry in which they get the best price.

ABSENCE OF SELLING COST - No advertisement or selling cost is involved because of homogeneous product and perfect knowledge amongst buyers and sellers,

ABSENCE OF TRANSPORTATION COST - No transportation cost is involved in market because sellers and buyers have the perfect knowledge about the market.

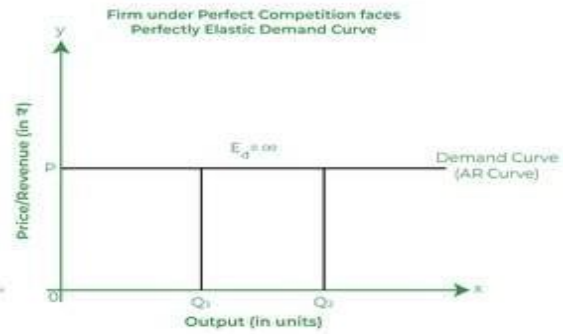
Firm under perfect competition is a price taker not a price maker.

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 under 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:

1. Both the statements are true.
2. Both the statements are false.
3. Statement 1 is true and Statement 2 is false
4. Statement 2 is true and Statement 1 is false

11. Statement 1: In Perfect competition selling costs are very high.
Statement 2: 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:-

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.

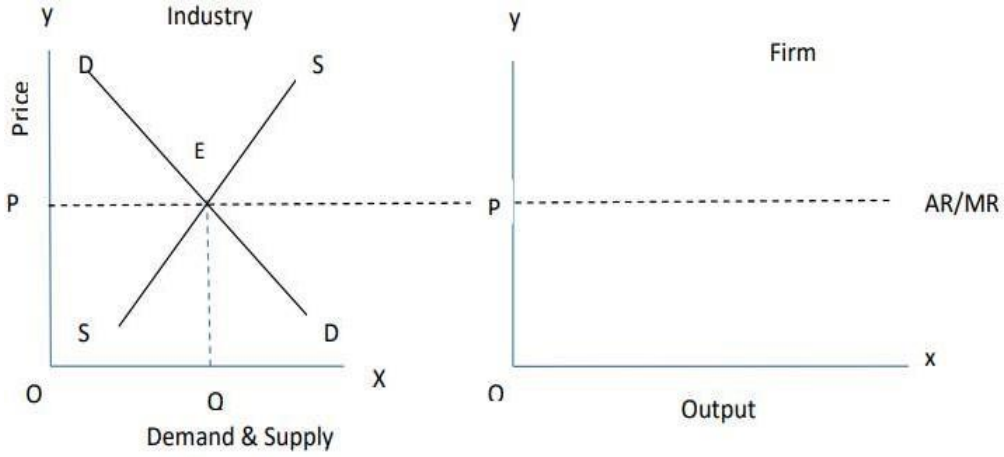
Homogeneous products: Products are uniform in nature. The products are perfect substitute of each other. No seller can charge a higher price for the product. Otherwise he will lose his customers.

Perfect knowledge: Buyers as well as sellers have complete knowledge about the product.

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:

13. 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 ANSWERS

1. ***(a) 2. (b) 3. (c) 4. (d) 5. (d) 6. (c) 7. (d) 8. Taker, Maker 9. Perfectly elastic 10 (a) 11(d) 12 (d) 13(d) 14(d) 15(d)***

PRICE DETERMINATION AND SIMPLE APPLICATIONS TOOLS OF DEMAND AND SUPPLY

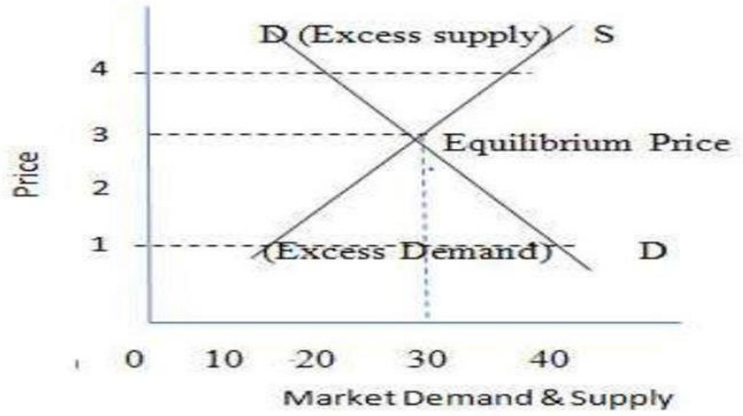
Determination of Market equilibrium under Perfect Competition

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.

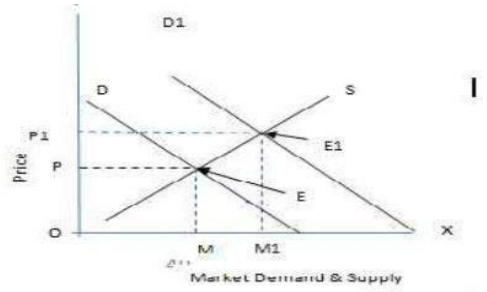
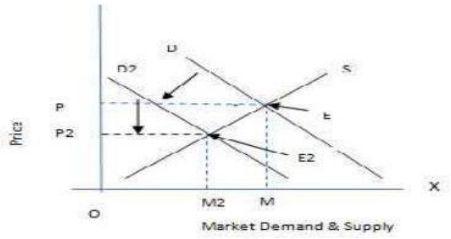
Price (Rs.)	Quantity Demand (Units)	Quantity Supply(Units)
1	50	10
2	40	20
3	**30**	**30**
4	20	40
5	10	50



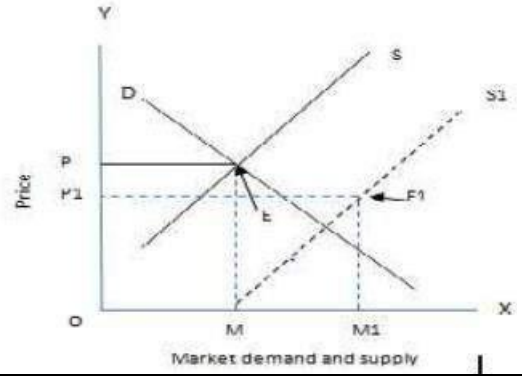
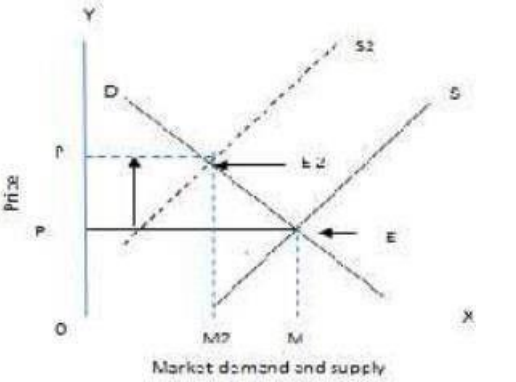
EXCESS DEMAND: - When there is Excess Demand in the market, the competition among the buyers to purchase the required quantity. Hence, they start offering higher prices. With rising market prices, demand contracts and supply expand. This market adjustment continues till the market reaches equilibrium.

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.

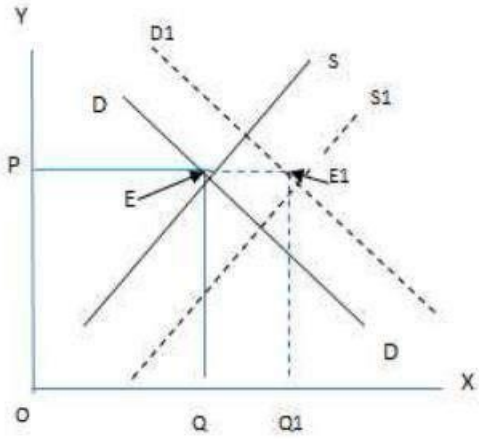
EFFECT OF CHANGES IN DEMAND AND SUPPLY ON MARKET EQUILIBRIUM CHANGE IN DEMAND

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.	
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. 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:

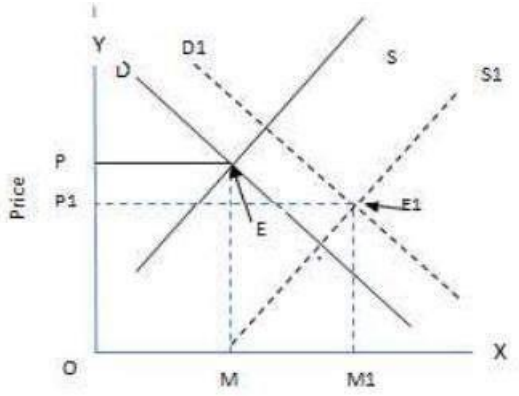
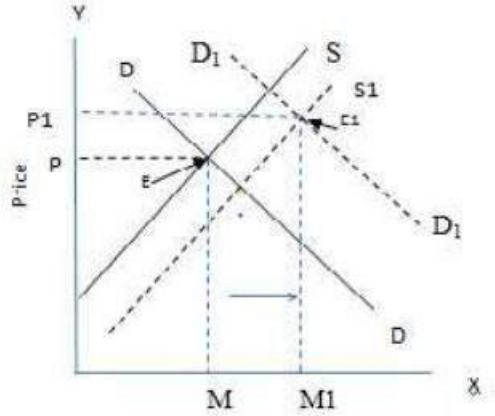
Increase in Supply: - In case of increase in supply and demand remains unchanged, supply curve shift to the right. Increase in supply shift the supply curve from S to S1 to right leading to excess SUPPLY. There will be competition among buyers leading to fall in price. As price fall supply starts rising (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	
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. MULTANEOUS 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.

Increase in demand < Increase in supply	Increase in demand > Increase in supply
	

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: -

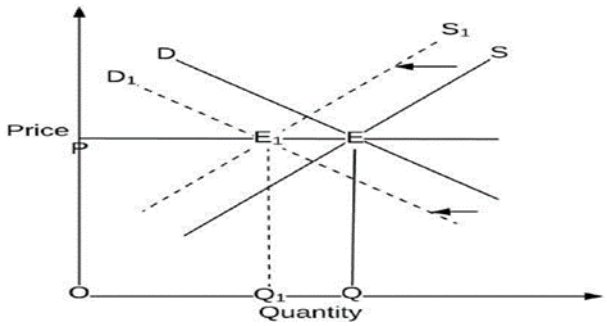
When increase in demand is proportionately less than increase in supply, then equilibrium price falls and equilibrium quantity increases.

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.

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:-

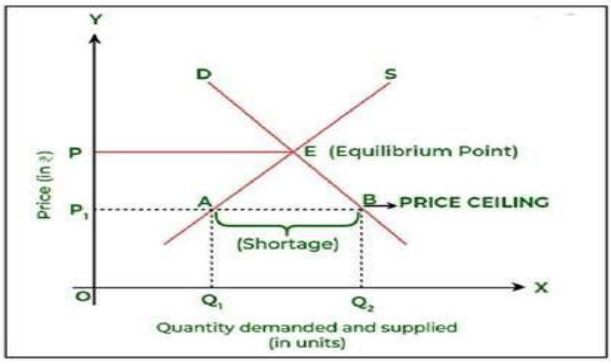
When decrease in demand is proportionately more than decrease in supply, then equilibrium price and equilibrium quantity both decreases. Decrease in price is less than decrease in quantity.

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:

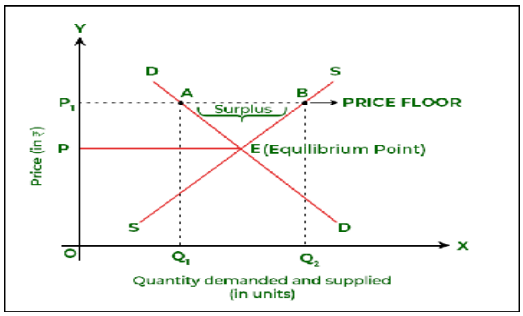
Black Marketing: Black market is any market in which the commodities are sold at a price higher than the maximum price fixed by the Government.

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:

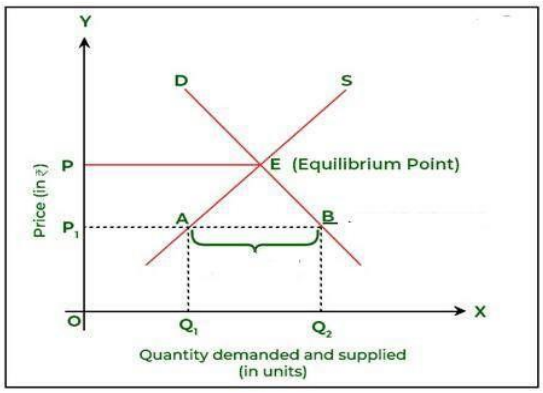
1. Equilibrium price is determined when;
   (a) Market demand for a commodity is zero
   (b) Market supply for a commodity is zero
   (c) Market demand and Market supply are equal
   (d) Market demand is either more or less than Market supply.
2. When Market demand is more than Market supply, it refers 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:



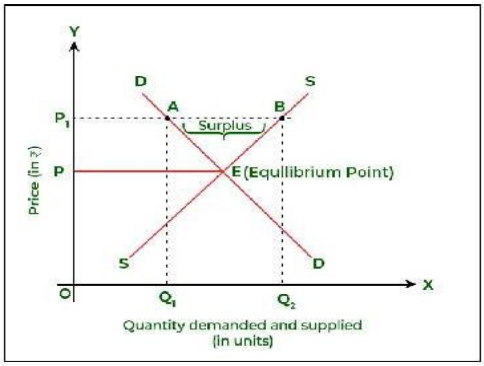
   (a) Excess supply (b) Excess demand (c) Equilibrium condition
   (b) None of these.

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)

10. 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

11. **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.
12. **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.
13. **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.
14. **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.
15. **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.

16. **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.
17. **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.
18. **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.
19. **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.
20. **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:

21. 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.

1. 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.
2. Out of 'price floor and price ceiling' which concept is used by the government to control the prices of essential commodities?
3. 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

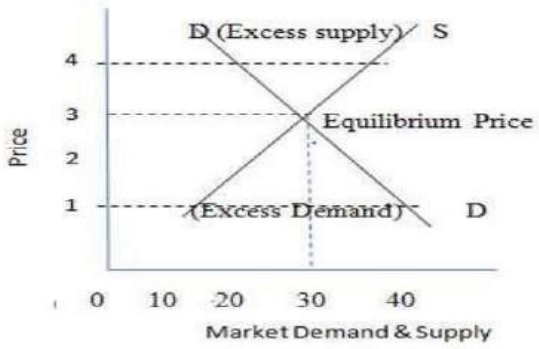
4. What will be the important tool in the hands of Government to ensure price floor?

SHORT ANSWER TYPE QUESTIONS:

22. 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



23. 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:

c) As we know that Market is in equilibrium Qd = Qs
d) 200-P= 50+2P (-) 3P= (-)150
e) Therefore, equilibrium price **= 50** and equilibrium quantity =200-50 = **150**
f) Under new price market is in equilibrium

Qd=Qs' 200-P= 80+2P

(-)3P = (-)120 P= **40** quantity =200-40=**160**

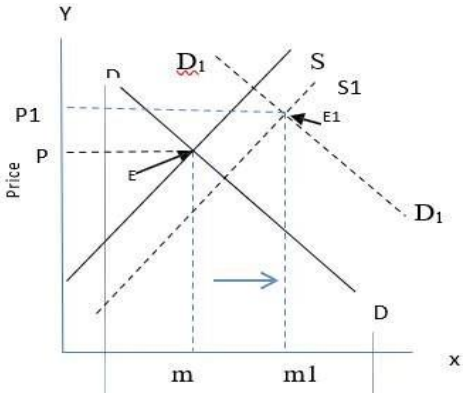
24. Market for a good is in equilibrium. There is simultaneous decrease both in demand and supply but there is no change in price. Explain how it is possible. Use schedule.

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

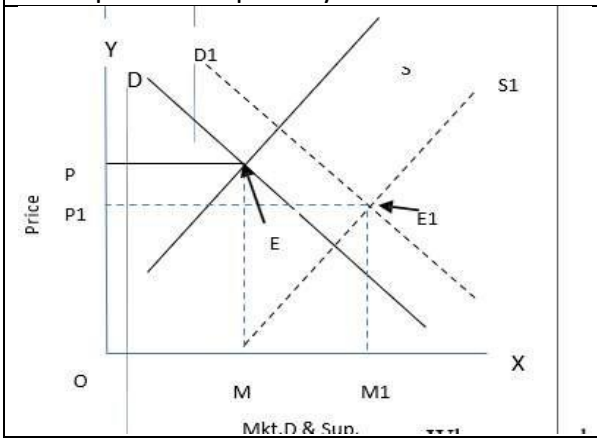
Above schedule, it is clear that at price Rs.3, the market demand is equal to market supply of 60 Units. Hence at Rs. 3, the market is in equilibrium. For market price to remain unchanged. decrease in demand should be exactly equal to decrease in supply.

When demand increases more than supply, then equilibrium price and equilibrium quantity both will increase.

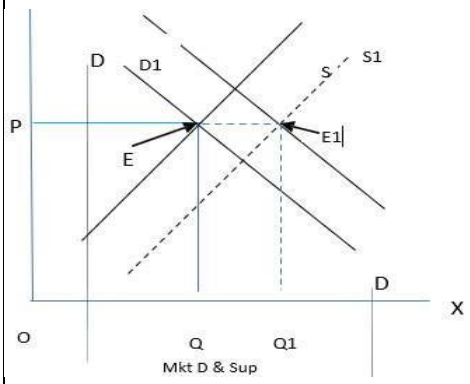


When increase in demand is more than increase in supply, price increases from OP to OP1. Quantity increases from OM to OM1. Increase in price is less than increase in quantity.

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.

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.	
1 (c)	10(c)	19.Black marketing	
2(b)	11(c)	20.Rises and falls	
3(c)	12(a)		
4(d)	13.Price ceiling		
5(a)	14.Buffer stock		
6(c)	15.Sellers		
7(b)	16.2, 46		
8(d)	17.falls and rises		
9 (b	18.Minimum Support Price.		

UNSOLVED HALF YEARLY EXAM QUESTION PAPER FOR CLASS XI (ECONOMICS)

General Instructions:

1. This question paper contains two parts – Part- A- Statistics for Economics Part-B- Introductory Microeconomics.

2. This paper contains 20 questions of 1 mark (question no 1 to 10 and 18 to 27) including multiple choice questions, assertion-reason questions, statements-based questions and one liner questions.

3. This paper contains 4 Short Answer type questions of 3 marks (question no 11to 12 and 28 to 29) each to be answered in 60 to 80 words.

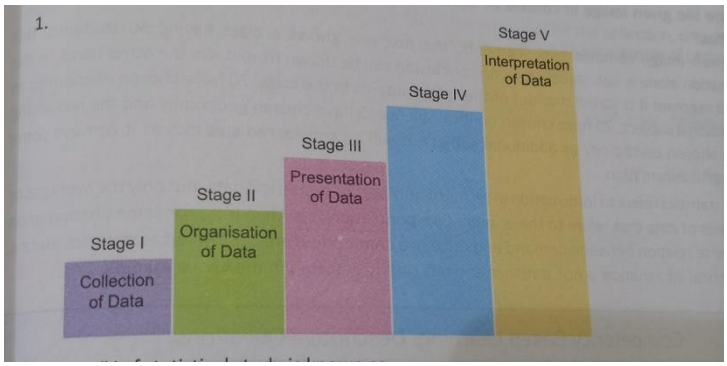
4. This question paper contains 6 short answer type questions of 4 marks (question no 13 to 15 and 30 to 32) each to be answered in 80 to 100 words.

5. This paper contains 4 Long Answer type questions of 6 marks (question no 16,17,33,34) each to be answered in 100 to 150 words.

PART-A- STATISTICS FOR ECONOMICS

VERY SHORT ANSWER TYPE QUESTIONS (1 Marks)

Q1. Stage IV Of statistical study is known as .....



(a) Layering of data (b) Analysis of data
(c) Classification of data (d) Layout of data

Q2. Which of the following is correct regarding statistics
(a) Aggregate of facts (b) numerically expressed
(c) affected by multiplicity of causes (d) All of these

Q3. The aggregate of data is called
(a) Statistics (b) editing of data
(c) analysis of data (d) Collection of data.

Q4. Schedules are filled by the:
(a) Investigator (b) Enumerator
(c) Respondent (d) None of these

Q5. Which of the following methods is used for the estimation of population in a country?
(a) Census Method (b) Sampling Method
(c). Both a and b (d). None of These

Q6. Classification of data on the basis of time period is called
A. geographical classification B. chronological classification
C. qualitative classification D. quantitative classification

Q7. Define percentage bar diagram.

Q8. In the following question a statement of Assertion (A) is followed by a statement of Reason(R) Choose the correct alternative among those 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
Assertion (A): The sum of squared deviations of the items from arithmetic mean is minimum.
Reason (R) Arithmetic mean is a positional average.

Q.9 In the following question two statements are given read the statement carefully and choose the correct alternate to among those given below
Statement 1: Median value is based on all the items of the series.
Statement 2: mode of a series cannot be graphically located.
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.

Q10. Eight workers earn the following income:

30, 36, 34, 40, 42, 46, 54, 62

Find out arithmetic mean.

SHORT ANSWER TYPE QUESTIONS (3 Marks)

Q11. The following table shows birth and death rate in India according to the census reports between 1931-40 to 2021-22 (hypothetical figures). Present the data in the form of a multiple bar diagram.

Year	1931-40	1941-50	1951-60	1961-70	1971-80	1981-90	1991-2000	2021-22
Birth rate (per thousand)	46	45	40	42	41	37	32.5	22.5
Death rate (per thousand)	36	31	27	23	19	15	11.5	7.3

OR

Q11. Explain the main parts of a table.

Q12. Following are the marks obtained by 25 students in economics. find out the mean marks by using assumed mean method.

Marks	10	20	30	40	50	60
Number of students	5	2	3	8	4	3

SHORT ANSWER TYPE QUESTIONS (4 Marks)

Q13. Read the following case study carefully and answer the questions i to iv on the basis of the same .

Descriptive statistics are used to organize and summarize data whether they come from studies of populations or samples. However, another type of statistics called inferential statistics is needed for making generalizations from samples to populations. For example, if a poll of 1,000 registered voters indicates that 55% approve of how the President is handling the economy, inferential statistics can be used to compute a margin of error, which is an allowance for the possible fluctuations due to sampling Thus, if the margin of error is 4 percentage points, we can be confident that the true percentage of the population who approve is between 51% and 59% (that 55% plus and minus 4%). Although inferential statistics perform an important function when we have sampled, they are not needed when we analyze the data of entire populations since there is no sampling error when we do not sample

(I) If a teacher of Class XI estimates average height of the entire class on the basis of average height of only a sample of students of the class, he/she is using

(Choose the correct alternative):

(a) descriptive statistics

(b) inferential statistics

(c) both of above

(d) none of these

(ii) In statistics …… refers to the aggregate of all items or units relating to any subject.

(Fill up the blank with correct alternative)

(a) sample

(b) population

(c) segment

(d) none of these

(iii) What do you mean by descriptive statistics?

(iv) Define Inferential Statistics.

Q14. The taste of 500 people of a society for different type of food was recorded as follows:

Type of Food	**North Indian**	**South Indian**	**Chinese**	**Italian**	**Mexican**
Number of People	**150**	**100**	**125**	**75**	**50**

Draw a pie diagram to represent the above data.

Q15. Calculate median from the following data:

Marks	**Number of Students**
Less than 10	4
Less than 20	16
Less than 30	40
Less than 40	76
Less than 50	96
Less than 60	112
Less than 70	120
Less than 80	125

OR

Q15. Describe the relation between mean, median and mode.

LONG ANSWER TYPE QUESTIONS (6 Marks)

Q16. From the following data, determine the mode by grouping method:

Size	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
Frequency	**2**	**3**	**6**	**12**	**20**	**24**	**25**	**7**	**5**	**3**	**1**

OR

Q16. What is mode? Discuss the merits, demerits and uses of mode.

Q17. Draw "less than" as well as "more than" ogive for the following data:

Weight (in kg)	**30-34**	**35-39**	**40-44**	**45-49**	**50-54**	**55-59**	**60-64**
Frequency	**3**	**5**	**12**	**18**	**14**	**6**	**2**

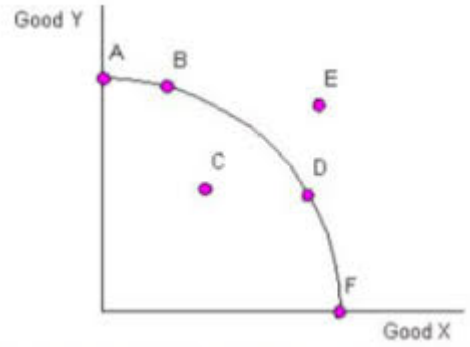
PART (B): MICRO ECONOMICS

VERY SHORT ANSWER TYPE QUESTIONS (1 Marks)

Q18. Which of the following is **NOT** concerned with the problem of choice?

(a) Excessive Income (b) Alternative use of resources (c) Unlimited wants (d) Limited Resources

Q19. In the following diagram, inefficient use of resources is shown by:



(a) Point A and B (b) Point D (c) Point C (d) Point C and D

Q20. With the increase in consumption by one unit of the commodity , total utility increases from 150 to 180 , then marginal utility is :

(a) 50 (b) 30 (c) 1.2 (d) 0.833

Q21. Slope of the Budget line indicates:

(a) Price ratio (b) income ratio (c) cost ratio (d) none of these.

Q22. Which of the following pairs represents substitute goods:

(a) Car and petrol (b) juice and cold drink (c) bread and butter (d) all of these

Q23. An increase in the price of electricity will cause the demand for electric appliances to

(a) Rise (b) fall (c) remain the same (d) none of these

Q24. Explain price elasticities of demand.

Q.25. Read the following statement carefully. Write true or false with reason.

"Price elasticity of demand is identical with slope of demand curve."

Assertion and reasoning:

In the following questions a statement of assertion (A) is followed by a statement of reason (R) . Choose the correct alternative among those 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

Q26. Assertion A: TP is constant when MP is zero.

Reason R: MP measures the change in TP.

Q27. Assertion A: Law of Variable proportion can be avoided.

Reason R: It is with improvement in technology that we can postpone the law of variable proportions. 1M

SHORT ANSWER TYPE QUESTIONS (3 Marks)

Q28. Explain the law of demand with the help of a demand schedule.

Q29. Distinguish between 'change in demand' and 'change in quantity demanded'.

OR

Q29. Explain market demand. Explain the factors that affect it.

SHORT ANSWER TYPE QUESTIONS (4 Marks)

Q30. What is meant by Production Possibility Curve? Illustrate with the help of table and diagram.

Q31. A consumer spends ₹60 on a goods priced at ₹ 5 per unit. When price falls by 20 per cent, the consumer continues to spend ₹ 60 on the good. Calculate price elasticity of demand by percentage method.

Q32. Define marginal utility. State and explain the law of diminishing marginal utility.

OR

Q32. Distinguish between total utility and marginal utility. Use diagram. 3+1M

LONG ANSWER TYPE QUESTIONS (6 Marks)

Q33. What do you understand by consumer's equilibrium? Show consumer's equilibrium with the help of indifference curve analysis.

Q34. Explain the law of variable proportions in terms of the behaviour of total physical product with the help of a diagram.

OR

Q34. Explain the relationships between followings:

A. Total product and Marginal product.

B. Marginal product and Average product.

C. Short run and long run.

SUGGESTIVE ANSWERS

PART-A- STATISTICS FOR ECONOMICS

VERY SHORT ANSWER TYPE QUESTIONS (1 Marks)

Q1. Ans.- (b) Analysis of data

Q2. Ans- (d) All of these.

Q3. Ans- (a) Statistics

Q4. Ans (b) Enumerator

Q5. Ans. (a) Census Method.

Q6. Ans- B. Chronological

Q7. Ans- percentage bar diagrams are those diagrams which show simultaneously different parts of the values of a set of data in terms of percentages.

Q8. Ans- C- Assertion (A) is true but Reason (R) is false

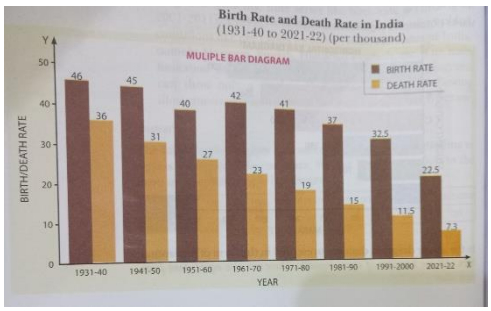
Q.9 Ans- b both the statements are false.

Q10. Ans- Arithmetic Mean = ₹43.

SHORT ANSWER TYPE QUESTIONS (3 Marks)

Q11.

Ans-



OR

Q11A. Ans- Parts of a table

1. table number 2. title 3 headnote 4 Stubs 5 caption 6 body 7 unit of measurement 8 footnotes 9 source

Q12. Solution: €f=25

Mean Marks= 35.2

Case Based Questions

SHORT ANSWER TYPE QUESTIONS (4 Marks)

Q13. (i). Ans-b inferential statistics

Ans- b population

(iii) Ans- descriptive statistics refer to those methods which are used for the collection ,presentation, As well as analysis of data.

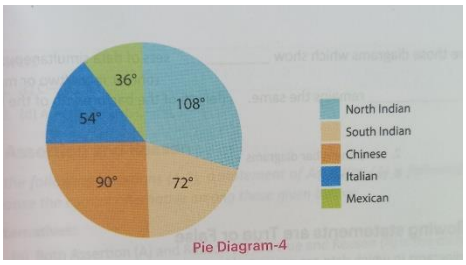
(iv) Inferential statistics refers to all such methods by which conclusions are drawn relating to the universe or population on the basis of a given sample.

Q14.

Draw a pie diagram to represent the above data.

Solution: Percentage of people with respective type of foods are 30, 20, 25, 15 and 10.

Number of people in terms of degree with respective type of foods are 108^0 ,72^0, 90^0, 54^0 and 36^0.



Q15. Solution: Σf = N= 125, Median = 36.25

OR

Q15 A. Ans- Relationship between mean media and mode.

LONG ANSWER TYPE QUESTIONS (6 Marks)

Q16. Ans. Mode = 12.

OR

Q16 A. Ans- Meaning of mode . Marit demerit and usage of mode.

Q17. Ans- Relevant ogive .

PART (B): MICRO ECONOMICS

VERY SHORT ANSWER TYPE QUESTIONS (1 Marks)

Q18. Ans: (a) Excessive Income

Q19. Ans (c) Point C

Q20. Ans. B 30

Q21. Ans. A price ratio.

Q22. Ans. B. juice and cold drink

Q23. Ans. b. fall

Q24. Ans- Price elasticities of demand is a measurement of the percentage change in quantity demanded in response to a given percentage change in own price of the commodity

Q.25. Ans- False

We know that Ed= ◇Q/◇P×P/Q and slop of demand curve =◇Q/◇P.

. Q26. Ans. A.

Q27. Ans. d.

SHORT ANSWER TYPE QUESTIONS (3 Marks)

Q28. Ans. Law of demand expresses inverse relationship between on price of a commodity and its quantity demanded. It means that other things being equal quantity demand did decreases with a rise in own price of the commodity and vice versa. geometrically it is represented by a downward sloping demand curve.

Q29. Ans- difference between change in demand and change in quantity demanded with help of relevant diagram.

OR

Q29A. Ans- meaning of marketed demand. Factors that affect market demand.

SHORT ANSWER TYPE QUESTIONS (4 Marks)

Q30. Ans- Meaning of production possibility curve. Table and diagram.

Q31.A Ans- Price elasticity of demand =1.25

Q32. Ans- Meaning of marginal and law of diminishing marginal utility.

OR

Q32A. Ans. Difference 3M

Diagram 1M

LONG ANSWER TYPE QUESTIONS (6 Marks)

Q33. Ans- Meaning of consumer's equilibrium 1 M

Conditions of consumers equilibrium 1M

Diagram 1M

Explanation 3M

Q34. Ans- Meaning of law 1 M

Assumptions of law 1 M

Diagram 1M

Explanation of all the three stages 3 marks

OR

Q34A.

Ans- relationships between:

total product and marginal product 2M

marginal product and average product 2M

short term and long run. 2M

KENDRIYA VIDYALAYA SANGATHAN

SESSION ENDING EXAMINATION: 2025-26

BLUE-PRINT

CLASS -XI SUBJECT-ECONOMICS

Theory: 80 Marks

Units	Objective Type/MCQ 1 marks	Short Answer 3 marks	Short Answer 4 marks	Long Answer 6 marks	Total marks
Part A- Statistics for Economics					
1. Introduction Collection, organization and presentation of data	1×5=5	2×3=6	1×4=4	-	15
2. Statistical tools and interpretation	1×5=5	-	2×4=8	2×6=12	25
Sub Total:	10(1×10)	6(2×3)	12(3×4)	12(2×6)	40(17)
Part B- Introductory Microeconomics					
3. Introduction	1×1=1	1×3=3			4
4. Consumer's Equilibrium and Demand	1×4=4	-	1×4=4	1×6=6	14
5. Producers behaviour and Supply	1×4=4	-	1×4=4	1×6=6	14
6. Forms of market and price determination under perfect Competition with simple application	1×1=1	1×3=3	1×4=4	-	8
Sub Total:	10(1×10)	6(2×3)	12(3×4)	12(2×6)	40(17)
Total(Part A and B):	20(1×20)	12(4×3)	24(6×4)	24(4×6)	80(34)

There will be 1 Internal Choice in 1-mark questions, 3-mark questions, 4 marks questions & 6 marks Questions in both Parts (A & B).

SET-1

KENDRIYA VIDYALAYA SANGATHAN

SESSON ENDING EXAMINATION 2025-26

CLASS -11 SUBJECT-ECONOMICS (030)

TIME: 3 HOURS **M.M. – 80**

GENERAL INSTRUCTIONS:

1. This question paper contains two sections:
   Section A – **Statistics for Economics.**
   Section B – **Introductory Microeconomics.**
2. This paper contains 20 Objective type/ Multiple Choice Questions of 1 mark each.
3. This paper contains 4 Short Answer Questions of 3 marks each to be answered in 60 to 80 words.
4. This paper contains 6 Short Answer Questions of 4 marks each to be answered in 80 to 100 words.
5. This paper contains 4 Long Answer Questions of 6 marks each to be answered in 100 to 150 words.

Part A-Statistics for Economics

Q. No.	Question	Marks
1	In most of the weighted index numbers, the weight pertains to: (a) Base year (b) Current year (c) Both Base and Current year (d) None of these	1
2	**Read the following statements carefully** **Statement 1**: A weighted aggregative price index using current period quantities as weights is known as Paasche's price index. **Statement 2:** In weighted index numbers, all items are given equal weightage. **In the light of the given statements, choose the correct alternative**: (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	1
3	**Read the following statements – Assertion (A) and reason(R). Choose the correct alternatives given below**: **Assertion (A):** When the values cannot be measured precisely, Spearman's Rank correlation can be used to measure the linear relationship numerically. **Reason (R):** Repeated ranks need correlation factor.	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	
4	The sum of deviations of items from the arithmetic mean is always: (a) Less than zero (b) Equal to zero (c) Less than one (d) Equal to one	1
5	Ankita was drawing a histogram from a given data. Bindita observed it and asked If she can draw one of the measures of central tendency from this histogram. Ankita replied positively. Which one of the following is possible. (a) Arithmetic mean (b) Median (c) Mode (d) Quartile	1
6	**Read the following statements carefully.** **Statement 1**: In a bar diagram, some space must be left between consecutive bars but in a histogram, no space is left between two rectangular bars. **Statement 2:** A pie diagram can be drawn for a discrete variable as well as a frequency distribution. **In the light of the given statements, choose the correct alternative**: (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	1
7	In a frequency distribution, higher the number of classes,_____ would be the size of each class limits. (a) Higher (b) Lower (c) Proportional (d) None of the above **OR** Loss of information can be found in: (a) Individual series (a) Discrete series (c) Frequency distribution (d) Ungrouped data	1
8	"A bar diagram comprises a group of Equi -width rectangular bars, whereas a histogram can have unequal rectangular bars." What is your opinion about the above statement? (a) The statement is correct (b) The statement is wrong (c) The statement is partially correct (d) None of the above	1

<table>
<tr><td>9</td><td>Which of the following is a try out method of data collection?
(a) Census Survey (b) Sample Survey (c) Pilot Survey (d) Random Survey</td><td>1</td></tr>
<tr><td>10</td><td>'Statistical methods are no substitute for common sense' is associated with:
(a) Functions of Statistics (b) Limitations of Statistics (c) Distrust of Statistics
(d) Importance of Statistics</td><td>1</td></tr>
<tr><td>11</td><td>"Statistics is an indispensable tool for economists."
Justify this statement with at least three suitable reasons.</td><td>3</td></tr>
<tr><td>12</td><td>What is a pilot survey? Why is it considered crucial for an enumerator for data collection?
OR
How is census method different from sampling method? Under which circumstances, census method is preferred to sampling method?</td><td>3</td></tr>
<tr><td>13</td><td>What is a frequency polygon? Draw it using the following data:
Daily Wages (Rs): 100–150 150–200 200–250 250–300 300-350
No. of Workers 5 8 10 6 4</td><td>4</td></tr>
<tr><td>14</td><td>What is the relative position of arithmetic mean, median and mode in the measures of central tendency? Justify with a suitable example.</td><td>4</td></tr>
<tr><td>15</td><td>What is a scatter diagram? Show various degrees of positive correlation graphically through scatter diagram.</td><td>4</td></tr>
<tr><td>16</td><td>Calculate the arithmetic mean of marks obtained by the students using step-deviation method. (6)
<table>
<tr><td>Marks:</td><td>0–5</td><td>5–10</td><td>10–15</td><td>15–20,</td><td>20–25</td></tr>
<tr><td>No. of Students:</td><td>2</td><td>4</td><td>6</td><td>5</td><td>3</td></tr>
</table>
(OR)
(a) Cite out any 2 properties of arithmetic mean. (2)
(b) Calculate median from the following data. (4)
<table>
<tr><td>X</td><td>3</td><td>15</td><td>8</td><td>10</td><td>20</td></tr>
<tr><td>F</td><td>8</td><td>5</td><td>6</td><td>3</td><td>2</td></tr>
</table></td><td>6</td></tr>
<tr><td>17</td><td>(a) Explain any three uses of index numbers. (3)
(b) Calculate the consumer price index using aggregate expenditure method from the following data: (3)
<table>
<tr><td>Items</td><td>Base year Price</td><td>Current year Price</td><td>Quantity (in kgs)</td></tr>
<tr><td>Rice</td><td>20</td><td>24</td><td>20</td></tr>
<tr><td>Atta</td><td>30</td><td>35</td><td>15</td></tr>
<tr><td>Dal</td><td>50</td><td>60</td><td>10</td></tr>
<tr><td>Sugar</td><td>40</td><td>50</td><td>5</td></tr>
</table></td><td>6</td></tr>
</table>

Part B- Introductory Microeconomics

Q. No.	Question	Marks
18	The production Possibilities curve concave to the origin due to the operation of: (A) Diminishing marginal rate of substitution (B) Diminishing marginal rate of transformation (C) Increasing marginal rate of substitution (D) Increasing marginal rate of transformation	1
19	**Read the following statements carefully** **Statement 1**: An Indifference curve can touch to any one the axes. **Statement 2:** At the point of equilibrium, the sLope of Budget Line is equal to the slope of Indifference map. In the light of the given statements, choose the correct alternative: (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	1
20	When $M \geq P_1X_1 + P_2X_2$, this equation represents: (a) Budget set (b) Budget constraint (c) Budget line (d) Consumer equilibrium	1
21	Rise in the price of the complementary good leads to: (a) Rightward shifting of demand curve (b) Leftward shifting of demand curve (c) Upward movement along the same demand curve (d) Downward movement along the same demand curve	1
22	In case of rectangular hyperbola demand curve, the elasticity of demand is: (A) equal to zero (B) equal to one (C) equal to infinity (D) greater than one.	1
23	If the supply curve starts above the origin, then the value of elasticity of supply will be: (A) greater than one (B) equal to one (C) less than one (D) equal to infinity	1

24	In case of excess demand for a good in the market, the equilibrium price remains: (a) Above the prevailing market price (b) Below the prevailing market price (c) Coincide with the market price (d) None of the above	1
25	Which of the following condition is fulfilled after the point of producer's equilibrium? (A) MR = MC (B) MC > MR (C) MC < MR (D) TR = TC	1
26	Riya, Rina, Gitika & Riddhika were discussing about the relationship between marginal cost & Average cost. Riya: MC Curve cuts AC Curve from above. Rina: As long as AC curve is falling, MC curve lies below AC curve. Riddhika: AC curve intersects MC curve at the minimum Point of MC curve. Gitika: When AC curve rises, the MC curve lies above AC curve. Who among the above are correct: (a) Riya & Rina (b) Riddhika & Gitika (c) Riya & Riddhika (d) Rina & Gitika	1
27	**Read the following statements – Assertion (A) and reason(R).** **Choose one of the alternatives given below**: **Assertion (A):** The second phase of Production is associated with fall in MP and rise in TP at a diminishing rate. **Reason (R):** AP rises when MP is above it and falls when MP is below it. (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
28	"An economy always produces on the production possibility curve but not inside it". Defend or refute with suitable reasons. **OR** What will be the impact of recently launched "Vikash Mela" by the Govt. of Odisha, on the production possibility curve?	3
29	What are the implications of the following features of perfectly competitive market? (a) Firm is a price taker. (b) Uniform price	3

<table>
<tr><td>30</td><td>How does a fall in the factor inputs price affect the equilibrium price and equilibrium quantity. Explain with diagram.</td><td>4</td></tr>
<tr><td>31</td><td>“A farmer practically experiences the operation of the law of variable proportions in agricultural production”. Elucidate the statement in terms of total product and marginal product with suitable example and diagram.</td><td>4</td></tr>
<tr><td>32</td><td>A Consumer consumes two goods; say apple and guava whose prices are ₹ 10/- and ₹ 5/- per unit respectively. At a particular point, marginal utility of Apple is 4 util and that of Guava is 2 util. Is the consumer in equilibrium? Give reason. Explain the mechanism the consumer will adopt in this situation. Use marginal utility analysis.
OR
(a) Define monotonic preference. Which property of the indifference curve is associated with this concept?
(b) Define Diminishing marginal rate of substitution. Which property of the indifference curve is associated with this term?</td><td>4</td></tr>
<tr><td>33</td><td>(a) A firm's Average cost of Producing 4 units of output is ₹ 10/- and given below is its Total Cost Schedule. Calculate Average Variable Cost (AVC) and Marginal Cost. (3)
<table>
<tr><td>Output</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>Total cost</td><td>140</td><td>200</td><td>240</td><td>300</td><td>400</td></tr>
</table>
(b)Differentiate between Implicit cost and explicit cost with examples. (3)
(OR)
(a)Briefly explain the relationship between Average revenue and Marginal revue facing a perfectly competitive market, with a suitable example and diagram. (3)
(b) The quantity supplied of Rasagolla is 50 units at the price ₹ 10/- Per unit. When Price rises by ₹ 5/- Per unit, the quantity supplied also increases by 50 units. Calculate Price elasticity of supply by percentage method. (3)</td><td>6</td></tr>
<tr><td>34</td><td>(a) What is the relationship between Budget line and indifference curve at the point of Consumer's equilibrium? Explain with a diagram. (3)
(b) Where does a consumer attain equilibrium in terms of single commodity? Use Marshallian utility analysis approach.</td><td>6</td></tr>
</table>

KENDRIYA VIDYALAYA SANGATHAN

SESSON ENDING EXAMINATION 2025-26

CLASS -11

SUBJECT-ECONOMICS (030)

MARKING SCHEME (SET-1)

TIME: 3 HOURS **M.M. – 80**

Part A-Statistics for Economics

Q. No.	Question	Marks
1	(a) Base year	1
2	(a) Statement 1 is true and statement 2 is false.	1
3	(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).	1
4	(b) Equal to zero.	1
5	(c) Mode	1
6	(a) Statement 1 is true and Statement 2 is false.	1
7	(b) Lower OR (c) frequency distribution	1
8	(a) The statement is correct.	1
9	(c) Pilot survey.	1
10	(b) Limitations of statistics.	1
11	Three reasons: i. Formulation of economic laws and policies. ii. Helps in understanding and solving economic problems. iii. Forecasting economic trends. Or any other relevant points.	3
12	Meaning of Pilot survey: Try out method of conducting survey with a small group before undertaking survey on a large group. Importance: i. It helps in pre-testing of questionnaire. ii. It helps in accessing the time and cost involved in the actual survey. iii. Any other relevant points) OR Meaning of census method and sampling method	3

	Circumstances: i. Smaller area of investigation ii. Reliable and accurate (or any other points)	
13	Meaning of frequency polygon: It is a plane bounded by straight lines by joining the mid points of the topside of the consecutive rectangles of the histogram. (1) Drawing of histogram. (1) Correct diagram of the frequency polygon. (2)	4
14	Mean > Median > Mode Or Mean < Median < Mode Or Mean = Median = Mode Median is always between arithmetic mean and mode Any numerical example with solution.	4
15	Meaning of scatter diagram: A scatter diagram is a useful technique for visually examining the form of relationship without calculating the numeric value. I. Perfect positive correlation II. High degree positive correlation III. Moderate degree positive correlation IV. Low degree positive correlation (with diagram of any three)	4
16	(a) Formula: (1 mark) (b) Calculation: step-by-step calculation. (4 marks) c) Correct Answer: Correct answer. (1 mark) $\bar{x}$=13 OR a) Properties of Arithmetic Mean: (i) The sum of deviations of items from the arithmetic mean is always equal to zero. (ii) The sum of squares of deviations of items from the arithmetic mean is always least. (b) Median: (i) Ascending/descending arrangement of scores. (1 mark) (ii) Calculation of cumulative frequency. (1 mark) (iii) Formula used. (1/2 mark) (iv) Correct calculation with answer. Me=15.	6
17	(a) Uses of Index Numbers: (i) Indispensable for measuring changes over time (e.g., in economic policy making). (ii) Helpful in wage negotiation, income policy, and taxation policy. (iii) Measures inflation rate. (b)Formula and calculation Correct answer $P_{01}= (\sum P_1q_0 / \sum P_0q_0) \times 100$	6

	P01= 119.67	

Part B- Introductory Microeconomics

		Marks
18	a) Increasing Marginal Rate of Transformation	1
19	(a) Both statements 1 & 2 are false.	1
20	(b) Budget Constraint.	1
21	(b) Leftward shifting of demand curve.	1
22	b) Equal to one.	1
23	(a) Greater than one.	1
24	(a) Above the Prevailing Market Price.	1
25	(b) MC > MR	1
26	(b)Rina and Gitika	1
27	(b)Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).	1
28	Defute – 1 mark Reason: Economy may produce inside PPC due to underutilization and misallocation of resources. (2 marks) OR (a) (i) Vikash mela will provide more employment opportunities. (b) (ii) Growth of resources. (c) (iii) Rightward shifting of PPC	3
29	a) Firm is a price taker: (i) A firm is a negligible contributor to the market. (ii) Cannot influence the price. (iii) Price is determined by market forces of demand and market supply. (iv) Hence a firm accepts the price, not decides the price. Any other points. b) Uniform price: (i) All products are homogeneous. (ii) Firms earn normal profit in the market. (iii) If a firm increases or decreases the price, it will be a loser. Any other points.	3
30	i) Fall in factor input price → Fall in marginal cost of production → More supply → rightward shifting of supply curve. (ii) Demand curve remains same when supply increases → Equilibrium price will fall but equilibrium quantity will increase.	4
31	(i) A farmer uses land, labour, capital (seed, fertilizer, pesticide, water, money, etc.) and himself as an organizer in agricultural production.	4

	(ii) Stages of Production: In the production process, he experiences three phases of production when he changes labour, keeping all other factor inputs constant. (iii) Explanation of behaviour of TP & MP with reference to the law of variable proportions. (3) (iv) A schedule and/or diagram. (1) (v)Any other explanation.	
32	(i)Yes. (ii) $MU_A/P_A=MU_G/P_G$ 10/4=5/2=2.5. (iii) No mechanism required. (iv) Diagram. OR a) Meaning of monotonic preference: (i) Between two bundles of two goods, the consumer will prefer that bundle which has at least one unit more of one good and not loss of other good. (ii) Higher indifference curve represents higher level of satisfaction. (b) Meaning of DMRS: The rate of sacrifice of one good (say Good-Y) goes on diminishing for consumption of an additional unit of the other good (say Good-X). (iii) An indifference curve convex to the origin.	4
33	83. (a) Output TP TFC TVC AVC SMC 1 140 40 100 100 100 2 200 40 160 80 60 3 240 40 200 66.7 40 4 300 40 260 65 60 5 400 40 360 72 100 (b)Implicit cost: The cost or value of inputs supplied by the owners including normal profit. Example: rent on self-owned land & building, wages to family member etc. Explicit cost: The cost incurred by a firm for purchasing & hiring factor inputs from outside. Example: Rent to land owner, wages to common, interest to bank. Etc **OR** (a) (i) AR & MR remain constant in perfectly competitive market. (ii) The MR & AR curve parallel to horizontal axis and coincide with each other. (2) (iii) One table & diagram. (1+1=2) (b) (i)Formula: (ii) Calculation: (iii) Correct answer: $E_{s=2}$	6
34	(a) At the point of equilibrium, the slope of price line is equal to the slope of indifference. (ii) Diagram with explanation. (2 marks)	6

	(b) Consumer equilibrium in terms of single commodity: (i) Where marginal utility of the commodity in terms of money is equal to its Price. Formula:(ii) Table and diagrams.	

SET-2

SESSON ENDING EXAMINATION -2025-26

CLASS -11

SUBJECT-ECONOMICS (030)

TIME: 3 HOURS **M.M. – 80**

GENERAL INSTRUCTIONS:

1. This question paper contains two sections:
   Section A – **Statistics for Economics**
   Section B – **Introductory Microeconomics**
2. This paper contains 20 Objective type/ Multiple Choice Questions of 1 mark each.
3. This paper contains 4 Short Answer Questions of 3 marks each to be answered in 60 to 80 words.
4. This paper contains 6 Short Answer Questions of 4 marks each to be answered in 80 to 100 words.
5. This paper contains 4 Long Answer Questions of 6 marks each to be answered in 100 to 150 words.

Part A-Statistics for Economics

Q. No.	Question	Marks
1	Conventionally, Index numbers are expressed in terms of: (a)Percentage (b)Ratio (c)Whole numbers (d)Relative value	1
2	**Read the following statements carefully** **Statement 1**: Using base period quantities as weights is known as Laspeyres's index number. **Statement 2:** In weighted index numbers, all items are given equal weightage. **In the light of the given statements, choose the correct alternative**: (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	1

	(d) Both statements 1 and 2 are false	
3	**Read the following statements – Assertion (A) and reason(R). Choose the correct alternatives given below**: **Assertion (A):** The value of correlation coefficient (r) is unaffected by the change of origin and change of scale. **Reason (R):** If the value of correlation coefficient (r) is outside $-1 \leq r \leq +1$, it will indicate error in calculation**.** (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
4	The sum of squares of deviation of items from the arithmetic mean is: (a) Equal to zero (b) Equal to one (c) least (d) maximum	1
5	Where is the relative position of median in any given series? (a) mean > mode > median (b) mean < mode < median (c) mode < median < mean (d) median < mean < mode	1
6	**Read the following statements carefully** **Statement 1**: For less than Ogive the cumulative frequencies are plotted against the respective upper limits of class interval. **Statement 2:** Mode, one of the measures of central tendency can be graphically drawn from the ogive. **In the light of the given statements, choose the correct alternative**: (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	1

	(d) Both statements 1 and 2 are false	
7	The class mid value of a frequency distribution is: (a)Half the sum of upper-class limit and lower-class limit (b)Half the difference between upper-class limit and lower-class limit (c)upper-class limit and lower-class limit x 2 (d)Half the product of upper-class limit and lower-class limit OR Classification of data with reference to geographical location are called: (a) Quantitative classification (b) Qualitative classification (c) Chronological classification (d) Spatial classification	1
8	A bar diagram comprises a group of equal-width rectangular bars, whereas a histogram can have unequal rectangular bars." What is your opinion about the above statement? (a) The statement is correct (b) The statement is wrong (c) The statement is partially correct (d) None of the above	1
9	Which one of the following is not an advantage of mailing questionnaire method? (a) Less expensive. (b) Can reach remote areas. (c) Best for sensitive question. (d) Reactions of respondent cannot be watched.	1
10	Statistical methods are no substitute for common sense is associated with: (a) Functions of Statistics (b) Limitations of Statistics (c) Distrust of Statistics (d) Importance of Statistics	1
11	Briefly explain three important functions of statistics.	3

<table>
<tr><td>12</td><td>How are random sampling different from non-random sampling? Explain each with an example.

OR

How are sampling errors different from non-sampling errors? Cite out at least 2 cases of non-sampling errors.</td><td>3</td></tr>
<tr><td>13</td><td>Define Ogive. Find out the Median from the following data.
Marks Scored 0-20 20-40 40-60 60-80 80-100
No. of Students 8 18 25 17 10</td><td>4</td></tr>
<tr><td>14</td><td>What is the relative position of arithmetic mean, median and mode in the measures of central tendency? Explain with a suitable example.</td><td>4</td></tr>
<tr><td>15</td><td>Briefly explain at least 4 properties of correlation coefficient.</td><td>4</td></tr>
<tr><td>16</td><td>a) What is the formula used to calculate median from continuous series? (1)
b) Calculate arithmetic mean using from the following data: (3)
<table>
<tr><td>Class Interval</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td></tr>
<tr><td>Frequency</td><td>4</td><td>6</td><td>10</td><td>3</td><td>2</td></tr>
</table>
(OR)
Calculate Arithmetic mean using step deviation method.
<table>
<tr><td>Income Ranges</td><td>1000-2000</td><td>2000-3000</td><td>3000-4000</td><td>4000-5000</td><td>5000-6000</td></tr>
<tr><td>No. of Household</td><td>6</td><td>4</td><td>5</td><td>3</td><td>2</td></tr>
</table></td><td>4</td></tr>
<tr><td>17</td><td>a) What are the basic features of a base period for construction of an index no. (3)
b) Calculate Index number using simple average of price relatives. (3)
Items Price of Base period Price of current P
A 50 60
B 100 90
C 200 250
D 20 30
E 30 65</td><td>6</td></tr>
</table>

Part B- Introductory Microeconomics

Q. No.	Question	Marks
18	Which economic problem involves the selection of category of people who choose to consume the goods. (a) What to produce (b) How to produce (c) How much to produce (d) For whom to produce	1
19	In consumer's equilibrium, the marginal utility of money _____ as consumption continues. (a) Increases (b Decreases (c) remains constant (d) All the above	1
20	**Read the following statements – Assertion (A) and reason(R). Choose one of the correct alternatives given below**: **Assertion (A):** The total utility increases at a diminishing rate as consumption increases. **Reason (R):** This happens due to the operation of law of diminishing marginal utility. (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
21	If a rise in the price of good - X results in the increases in the quantity demanded for good-Y, then two goods are said to be: (a)Substitute goods (b)Complementary goods (c) Inferior goods (d)Giffen goods	1
22	In case of life saving drugs, the value of elasticity of demand will be: (a) equal to zero (b) equal to unity (c) greater than unity (d) less than zero unity	1
23	If a commodity has a large number of substitutes, then the elasticity of demand for that good will be: (a) equal to unity (b) equal to zero (c) less elastic (d) more elastic	1
24	In case of excess supply for a good in the market, which mechanism is to be adopted to ensure equilibrium price: (a) By Pulling down the price (b) By Pushing up the price (b) No change in the price (b) By Government intervention	1

25	**Read the following statements carefully** **Statement 1**: Total revenue may be proportional or not depends on the market faced by a firm. **Statement 2:** Marginal revenue curve and Average revenue curve coincide with each other, facing a perfectly competitive market. **In the light of the given statements, choose the correct alternative**:) 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	1
26	Which of the following is incorrect regarding cost? (a) TFC & TC are equal at zero level of output. (b) AFC curve is a rectangular hyperbola curve. (c) SAC curve lies above the AFC curve but below the AVC curve. (d) As production continues, the gap between SAC and AVC decreases.	1
27	The minimum electricity and telephone bill of a firm is an example of: (a) Total Fixed Cost (b) Total Variable cost (c) Total cost (d) Marginal cost	1
28	What will be the impact of recently launched "Vikash Mela" by the Govt. of Odisha, on the production possibility curve. **OR** How can you explain the central problems of" How to Produce" with an example.	3
29	Briefly explain the two important features of a perfectly competitive market.	3
30	Why does the Govt intervenes the market with "ceiling price"? Mention its effects and remedial measure with a diagram.	4
31	"A farmer practically experiences the operation of the law of variable proportions in agricultural production". Elucidate the statement in terms of total product and marginal production with suitable example and diagram.	4
32	(a) Define monotonic preference. Which property of the indifference curve is associated with this term? (2) (b) Define Diminishing marginal rate of substitution. Which property of the indifference curve is associated with this term? (2) OR Explain: (a) How is change in demand different from change in quantity demanded? (2) (b) How does a fall in the price of a substitute good affect the demand curve for a given good? (2)	4
33	A firm's Average fixed cost of Producing 5 units of output is ₹ 10/- and the marginal cost schedule is given below. Calculate Average Total Cost and Average variable cost. (4)	6

	Output (Q) 1 2 3 4 5 SMC 20 15 10 25 50 (b) Briefly explain two factors affecting elasticity of supply of a commodity.	
34	(a) Where does a consumer attain equilibrium in terms of Single commodity? Explain with utility approach. (3) (b) As the consumer go on consuming additional units of a particular commodity the total utility behaves differently. Explain the statement with a schedule and diagram. (3)	6

SESSON ENDING EXAMINATION 2025-26

CLASS -11

SUBJECT-ECONOMICS (030)

MARKING SCHEME (SET-2)

TIME: 3 HOURS **M.M. – 80**

Part A-Statistics for Economics

Q. No.	Question	Marks
1	(a)Percentage	1
2	(a) Statement 1 is true and statement 2 is false	1
3	b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).	1
4	(c)least	1
5	(c) mode < median < mean	1
6	(a) Statement 1 is true and statement 2 is false	1
7	(a)Half the sum of upper-class limit and lower-class limit **Or** (d) Spatial classification	1
8	a) The statement is correct	1
9	(d) Reactions of respondent cannot be watched	1
10	(b) Limitations of Statistics	1
11	i. Simplifies complex data ii. Formulation of policies iii. Establish cause and effect of relationship iv. Any other feasible points	3
12	Random Sampling: In the random sampling, every individual has an equal chance of being selected. Example: Non-Random Sampling: In non-random sampling, all individuals don't have equal chance of being selected as a sample. The convenience or judgement of the investigator plays an important role. There may be biasedness. Example: **OR** Sampling error is the difference between the sample estimate and the actual value of the population. Non-sampling errors are found in census method due to errors in data acquisition, errors of non-response, recording mistake etc.	3
13	Ogive is the cumulative frequency curve drawn from a frequency distribution. It can be more than ogive and less than ogive. (1)	4

	(i) Calculation and Drawing of Ogives (2) (ii) Demarcation of median (1)	
14	Mean > Median > Mode Or Mean < Median < Mode Or Mean = Median = Mode Median is always between arithmetic mean and mode Any numerical example with solution.	4
15	(i) If r=−1 or r=1, the correlation is perfect. (ii) If r=0, the two variables are uncorrelated. (iii) The value of r is independent of the change of origin and change of scale. (iv) r is a pure number. (1 x 4 = 4) Any other relevant point.	4
16	(a)(i) Median class = N/2 th item. (ii) Me=L1+(N/2−c)/f × C. (b)(i) Formula = 1 mark. (ii) Calculation = 2 marks. (iii) Correct answer = 1 mark. Answer = Me=22.5 OR (i) Formula: $\bar{X}$=A+ ∑fd ′/N) × C = 1 mark. (ii) Calculation = 4 marks. (iii) Correct answer = 1 mark. X =3050 Ans.	6
17	(a) Base year: (i) Price stability. (ii) Political stability and no natural calamities. (iii) Not too far or too near. (iv) Not less than one month or more than one year. (b) Formula = 1 mark. Calculation P_{01} = (∑(P1/P0) X 100)/N =140.32.	6

Part B- Introductory Microeconomics

Q. No.	Question	Marks
18	(d) For whom to produce	1
19	(c) remains constant	1
20	a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A	1
21	a) Substitute goods	1
22	(a) equal to zero	1
23	(d) more elastic	1
24	(a)By Pulling down the price	1
25	(c) Both statements 1 and 2 are true	1
26	(c) SAC curve lies above the AFC curve but below the AVC curve.	1
27	(a) Total Fixed Cost	1
28	Defute – 1 mark Reason: Economy may produce inside PPC due to underutilization and misallocation of resources. (2 marks) OR (d) Vikash mela will provide more employment opportunities. (e) (ii) Growth of resources.	3

	(f) (iii) Rightward shifting of PPC **OR** How to produce is related with the techniques of production. Whether labour intensive technique or capital-intensive techniques of production to be adopted.	
29	(i) large no. of sellers & large no. of buyers (ii) Homogeneous product with close substitute. (iii) uniform price. (iv) free Entry & free exit. Any other points.	3
30	The govt intervenes the market with ceiling price to protect the interest of consumers. Effects: (i) Excess demand in market. (ii) Black marketing, hoarding, adulteration etc. Measures (i) provision of goods at subsidized prices. (ii) Strict action against malpractices	4
31	(a) A farmer uses land, labour, capital (seed, fertilizer, pesticide, water, money, etc.) and himself as an organizer in agricultural production. (b) Stages of Production: In the production process, he experiences three phases of production when he changes labour, keeping all other factor inputs constant. (c) Explanation of behaviour of TP & MP with reference to the law of variable proportion. (d) A schedule and/or diagram. Any other explanation.	4
32	a) Meaning of monotonic preference: (i) Between two bundles of two goods, the consumer will prefer that bundle which has at least one unit more of one good and not loss of other good. (ii) Higher indifference curve represents higher level of satisfaction. (b) Meaning of DMRS: The rate of sacrifice of one good (say Good-Y) goes on diminishing for consumption of an additional unit of the other good (say Good-X). (iii) An indifference curve convex to the origin. **OR** (a) Change in demand refers to the change in (increase or decrease) in the quantity demanded for a commodity due to other determinants, keeping the price of the commodity constant. (b) Change in quantity demanded refers to change in quantity demanded for a commodity due to change in its price only, keeping all other determinants constant. (b) A fall in the price of substitute goods will result in the fall in quantity demanded for a given good. Hence there will be a leftward shifting of demand curve. (2)	4
33	(a) Output SMC TFC TVC TC ATC AVC 1 20 50 20 70 70 20 2 15 50 35 85 82.5 17.5 3 10 50 45 95 31.67 15 4 25 50 70 120 30 17.5 5 50 50 120 170 34 24 (b) (i) Nature of good with explanation. (ii) Availability of substitutes. (iii) Time period of supply.	6

34	a) The point where marginal utility of the commodity in terms of money is equal to its price. MUx/MUm=Px ; MUm=Px X MUm. (1+2=3) Explanation with diagram. (b) Yes, initially Total Utility increases at a diminishing rate, then reaches at the maximum point and at last it declines, as consumption continues.(1) Table & diagram. (2)	6

UNSOLVED QUESTION PAPER FOR SESSION ENDING EXAM XI ECONOMICS

General Instructions:

i. This question paper contains two parts:
Part A - Statistics for Economics (40 marks) Part B – Micro Economics (40 marks).

All questions in both the sections are compulsory. Marks for questions are indicated against each.

ii. Questions No.1 – 10 and 18 – 27 are very short-answer questions carrying 1 mark each. They are required to be answered in one word or one sentence each.
iii. Questions No. 11–12 and 28 – 29 are short-answer questions carrying 3 marks each. Answers to them should not normally exceed 60-80 words each.
iv. Questions No. 13 – 15 and 30 – 32 are also short-answer questions carrying 4 marks each. Answers to them should not normally exceed 80-100 words each.
v. Questions No. 16 – 17 and 33 – 34 are long-answer questions carrying 6 marks each. Answers to them should not normally exceed 100-150 words each.
vi. Answers should be brief and to the point and the above word limits should be adhered to as far as possible.

PART –A STATISTICS FOR ECONOMICS

1. Which economic activity deals with manufacturing of goods? 1
   a. Consumption b. Exchange c. Production d. Distribution
2. The word "statistics" used as: 1
   a. Singular b. Plural c. Singular and Plural both d. None of These
3. The quickest method to collect Primary data. 1
   a. Direct personal investigation b. Indirect oral investigation
   b. Telephone interview d. Mailed questionnaire method
4. In an ordered series, the data are: 1
   a. In descending order b. In ascending order c. Either a or b d. None of these
5. The heading of the row given in the first column of a table are called: 1
   a. Stubs b. Titles c. Captions d. Prefatory notes

   Or

   State the meaning of the term 'Variable'

6. The value of all the items taken into consideration in the calculation of: 1
   b. Median b. Mean c. Mode d. All of the above
6. Mean of 2, 3, 8, 4, 9, 6, 5, is 1
   a. 9 b. 8 c. 5 d. 6
   Or Define Mean
7. The correlation between sale of woollen cloth and summer season is: 1
   a. positive correlation b. negative correlation c. Zero d. None of these.
8. What are limits of the coefficient of correlation? 1
   a. -1 and 0 b. No limits c. 0 and 1 d. -1 and 1 including the limits

9. In most of the weighted numbers, the weight pertains to: 1
   a. Base year b. Current year c. Both current year and base year. D. None of these.
10. Find out the median from the following data. 3

X	106	150	152	161	156
Y	5	8	6	3	7

12. What kind of relationship exist between X and Y, if the point of scatter diagram falls near a straight line with negative slope. Use diagram in support of your answer. 3

OR

On what basis does the base year taken into consideration to calculate index number?

13. Draw Histogram and Frequency polygon with the help of following data. 4

Wages	0 -20	20 - 40	40 -60	60 -80	80 - 100
No. of Workers	28	46	54	42	30

OR

Present the following data with the help of suitable diagram.

YEAR	Production (in '000 tonnes)		
	Wheat	Rice	Cotton
2014	35	22	10
2015	15	25	16
2016	40	12	20

14, Write the four uses of consumer price Index Number. 4

OR

Define Mode. Write its three Demerits.

15. Compute the coefficient of rank correlation from the following data. 4

X	87	22	33	75	37
Y	29	63	52	46	48

16. Use Ogive to represent the following data and locate the Median. 6

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No of Students	3	4	8	10	3	2

OR

Calculate Karl Pearson Coefficient of correlation from the following Data.

X	10	12	14	12	16	20
Y	22	26	24	27	31	33

17. What are the different uses of index number? Explain any two. 6

PART B: INTRODUCTORY MICROECONOMICS

18. Which of the following statement is false? 1

(a) PPC slopes downwards. (b) PPC is concave.
(c) PPC is slope upward. (d) PPC is not convex. OR

Which of the following is the cause of economic problem?

(a) Scarcity of resources (b)Unlimited wants

(c) Resources have alternative uses (d) All of these

19. When marginal utility is zero total utility will be ……. 1

(a) Zero (b)100 (c) Maximum (d) minimum

20. Any statement about demand for a good is considered complete only when the following is/are mentioned in it (Choose the correct alternative) 1

(a) Price of the goods (b) Quantity of the goods

(c) Period of time (d) All of the above

21. Floor price is set at ……level by government to protect the …… 1

(a) Above the equilibrium price level, consumer

(b) Below the equilibrium level, consumer

(c) Above the equilibrium price level, Producers

(d) Below the equilibrium level, Producers

22. Read the following statements Assertion (A) and Reason (R). Choose one of the correct alternatives given below: 1

Assertion (A) -Demand for salt is inelastic.

Reason (R) - In case of elastic demand, percentage change in price of the commodity causes relatively less than percentage change in quantity demanded.

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.

23. Read the following statements carefully: 1

Statement 1- Tea and coffee are substitute goods. Statement 2 –Car and petrol are substitute goods.

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.

24. Read the following statements carefully: 1

Statement 1- There are large numbers of buyers and few sellers in the perfect competition market. Statement 2 - In perfect competition market products are heterogeneous.

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.

25. When price of a good falls from Rs 15 to Rs 12 per unit means a fall of 20% in prices, its demand rises by 25%. Price elasticity of demand will be 1

(a) -15/12 (b) -12/15 (C) -25/20 (d) -20/25

26. Definitely producer will do .....in supply, if the price of normal goods increases 1

(a) Minimise (b) Decrease (c) Increase (d) Stop supply.

OR

Read the following statements carefully:

Statement 1-When TR increases at increasing rate then MR also increases. Statement II-When TR increases at a diminishing rate then MR decline.

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.

27. In a perfect competition market, a firm is a price taker and market is a price maker. _____curve is horizontal straight line parallel to x-axis.1

(a) Marginal Cost (b) Total Cost

(c) Marginal Revenue (d) Total Revenue

28. Explain the central problem of in ''choice of technique''. 3

29. What is the price ceiling? What is the common purpose for the price ceiling imposed by the government? 3

OR

"In perfect competition market a firm is said to be price taker and market is said to be price maker". Explain.

30. Explain with diagram the difference between increase in demand and increase in quantity demanded of a good. 4

31. Complete the following table: 4

Output (units)	Average Fixed Cost (Rs)	Average Variable Cost (Rs)	Marginal Cost (Rs)	Total Cost (Rs)
1	120	40	----	-------
2	60	56	----	232
3	----	54	-----	-------
4	30	------	54	----

32. What is the law of variable return to factor? Explain with the help of numerical example and diagram. 4

OR

Differentiate between Fixed factors and Variable factors of production.

33. Explain consumer equilibrium with the help of indifference curve analysis. 6

OR

A consumer consumes only two goods X and Y whose prices are Rs 5 and Rs 4 respectively. If the consumer chooses a combination of the two goods with marginal utility of X equal to 4 and that of Y equal to 5, is the consumer in equilibrium? Why or why not? What will a rational consumer do in this situation? Use utility analysis.

34. Explain with numerical example and diagram the conditions of producer's equilibrium in terms of marginal revenue and marginal cost. 6

BEST WISHES