

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI
END-OF-SEMESTER EXAMINATIONS : MAY 2026

B.A.ECONOMICS
SEMESTER: VI

MAXIMUM MARKS: 75
TIME : 3 HOURS

PART-III

STATISTICAL METHODS -II

SECTION – A

(10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

(K1)

1. An index number is mainly used to measure _____
a) Absolute change b) Relative change c) Structural change d) Institutional change
2. Which of the following is a mathematical method of measuring Trend?
a) Graphic Method b) Moving Average Method
c) Semi-Average Method d) Least Square Method
3. The main purpose of a research design is to _____
a) Increase cost of research b) Reduce errors and bias
c) Delay the research process d) Avoid data collection
4. Census method involves _____
a) Studying only a part of the population b) Studying the whole population
c) Studying secondary data d) Estimation through probability
5. Population census in India is conducted once in _____
a) 5 years b) 8 years c) 10 years d) 15 years

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES

(K2)

6. What is meant by an Index Number?
7. Define Seasonal Variations.
8. What is meant by planning of an Enquiry?
9. Define Sampling.
10. What is meant by National Income?

SECTION – B

(5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(K3)

11. a) Explain Weighted Index Numbers and Fisher's Ideal Index.

(OR)

- b) Explain Bowley's Index Number.

12. a) Explain Seasonal and Cyclical Variations in Time Series.

(OR)

b) Explain Semi-Average Method of Trend Measurement.

13. a) Discuss the need for Research Design.

(OR)

b) Explain the planning and execution of a Statistical Survey.

14. a) Elucidate essentials of Sampling.

(OR)

b) Explain Convenience Sampling.

15. a) Explain the defects in Agricultural Statistics in India.

(OR)

b) Explain National Income estimation methods in India.

SECTION – C

(5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.(K4 (Or) K5)

16. a) Explain Laspeyres Index Number with Merits and Demerits.

(OR)

b) Explain Consumer Price Index and its Importance.

17. a) Explain the components of a Time Series.

(OR)

b) Describe Least Square Method of measuring Trend.

18. a) Discuss the features of a good Research Design.

(OR)

b) Explain the important concepts relating to Research Design.

19. a) Describe the Random Sampling and its Merits.

(OR)

b) Discuss various methods of Sampling.

20. a) Describe the functions and publications of the Statistical Organization of India.

(OR)

b) Explain the methods of collecting Population Census data in India.

Scheme of Valuation

Course Code: 23UEO 6E4

Title of the Paper: STATISTICAL METHODS -II

Programme : BA (ECONOMICS)

SECTION – A

Key Answer:-

1. b) Relative change
2. d) Least Square Method
3. b) Reduce errors and bias
4. b) Studying the whole population
5. c) 10 years

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES

6. Index Number: A statistical measure showing changes in variables over time.
7. Seasonal Variations: Regular fluctuations in data occurring within a year.
8. Planning of an Enquiry: Systematic preparation for collecting statistical data.
9. Sampling: Selecting a part of the population to represent the whole.
10. National Income: Total value of final goods and services produced in a country in one year.

SECTION – B

11. a) Weighted Index Numbers and Fisher's Ideal Index

Weighted Index Numbers

Weighted index numbers are index numbers in which different weights are assigned to different commodities according to their relative importance. Since all commodities do not have equal significance, weighting gives more accuracy than simple index numbers.

Common weighted index numbers:

1. Laspeyres Index
2. Paasche Index
3. Fisher's Ideal Index
4. Marshall–Edgeworth Index

Merits:

- Reflect relative importance of items
- More realistic and reliable
- Widely used in economic analysis

Fisher's Ideal Index

Fisher's Ideal Index is the **geometric mean of Laspeyres and Paasche index numbers** and is considered the best index number.

$$\text{Fisher's Price Index} = \sqrt{(L \times P)}$$
$$\text{Fisher's Price Index} = (L \times P)^{1/2}$$

Where

- L = Laspeyres Index
- P = Paasche Index

Features:

- Satisfies **Time Reversal Test**
- Satisfies **Factor Reversal Test**
- Free from bias of base or current year

b) Bowley's Index Number

Bowley's Index Number is a weighted average of Laspeyres and Paasche index numbers, using the arithmetic mean.

$$\text{Bowley's Index} = \frac{L + P}{2}$$
$$\text{Bowley's Index} = 2L + P$$

Features:

- Simple to calculate
- Reduces extreme bias of Laspeyres and Paasche
- Less accurate than Fisher's Index

Limitation:

It does not satisfy time reversal and factor reversal tests.

12. a) Seasonal and Cyclical Variations in Time Series

Seasonal Variations

Seasonal variations refer to **regular and periodic fluctuations** occurring within a year due to seasonal factors.

Causes:

- Climate changes
- Festivals
- Agricultural cycles

Examples:

- Increase in ice cream sales during summer
- Higher demand for umbrellas in monsoon

Cyclical Variations

Cyclical variations are **long-term oscillations** in economic activities occurring over several years.

Phases of Business Cycle:

1. Prosperity

2. Recession
3. Depression
4. Recovery

Examples:

- Periodic booms and slumps in industrial production

b) Semi-Average Method of Trend Measurement

The Semi-Average Method is a **simple method** used to measure the long-term trend in time series.

Steps:

1. Divide the time series into two equal parts
2. Find the average of each part
3. Plot these averages on a graph
4. Join the two points to obtain the trend line

Merits:

- Simple and easy
- Useful for rough analysis

Limitations:

- Not suitable for fluctuating data
- Less accurate than least squares method

13. a) Need for Research Design

Research design is a **systematic plan** for conducting a research study.

Need for Research Design:

1. Provides clarity to research objectives
2. Helps in selecting appropriate methods
3. Ensures systematic data collection
4. Saves time and cost
5. Reduces errors and bias
6. Improves reliability of results

b) Planning and Execution of a Statistical Survey

Planning of a Statistical Survey

1. Statement of objectives
2. Scope and coverage
3. Selection of method (census or sample)
4. Designing questionnaire
5. Choice of sampling method
6. Organization of field work

Execution of a Statistical Survey

1. Training of investigators

2. Collection of data
3. Scrutiny and editing of data
4. Classification and tabulation
5. Analysis and interpretation
6. Presentation of results

14. a) Essentials of Sampling

Sampling is the selection of a **representative part** of the population.

Essentials of Good Sampling:

1. Clearly defined universe
2. Representative sample
3. Adequate sample size
4. Homogeneity of units
5. Proper sampling method
6. Free from bias
7. Accuracy and reliability

b) Convenience Sampling

Convenience sampling is a **non-probability sampling method** where samples are selected based on **ease of access**.

Features:

- Quick and inexpensive
- No scientific basis
- Suitable for preliminary studies

Limitations:

- Biased results
- Lack of representativeness
- Not suitable for generalization

15. a) Defects in Agricultural Statistics in India

Agricultural statistics in India suffer from several limitations:

1. Inaccurate reporting by farmers
2. Use of outdated methods
3. Inadequate trained staff
4. Delay in data collection
5. Political and administrative interference
6. Lack of uniformity across states
7. Estimation errors in crop area and yield

Result:

These defects affect agricultural planning and policy formulation.

b) National Income Estimation Methods in India

India follows **three main methods** to estimate National Income:

1. Production (Value Added) Method

- Measures value added by different sectors
- Used mainly for agriculture and manufacturing

2. Income Method

- Sum of all factor incomes like wages, rent, interest, and profit
- Used for organized sectors

3. Expenditure Method

- Sum of consumption, investment, government expenditure, and net exports

SECTION – C

16. a) Laspeyres Index Number – Explanation, Merits and Demerits

Laspeyres Index Number measures changes in prices by using **base year quantities as weights**. It shows how much the cost of purchasing the base year basket of goods has changed in the current year.

Merits:

1. Simple to understand and easy to calculate.
2. Requires only base year quantity data.
3. Useful for long-term comparisons.

Demerits:

1. Ignores changes in consumption pattern.
2. Overstates price rise as it uses fixed base year quantities.
3. Becomes unrealistic when the base year is too old.

b) Consumer Price Index (CPI) and its Importance

Consumer Price Index measures the **average change in prices of goods and services consumed by a particular group of consumers** over a period of time. It reflects changes in the cost of living.

Importance:

1. Used to measure inflation and cost of living.
2. Basis for wage revision and Dearness Allowance (DA).
3. Helps government in policy formulation.
4. Useful for comparing purchasing power over time.

17. a) Components of a Time Series

A Time Series consists of the following components:

1. **Trend (T):** Long-term movement showing general direction.
2. **Seasonal Variation (S):** Regular variations within a year.
3. **Cyclical Variation (C):** Long-term fluctuations due to business cycles.
4. **Irregular Variation (I):** Unpredictable changes due to unforeseen events.

b) Least Square Method of Measuring Trend

The Least Square Method fits a **trend line** to time series data by minimizing the sum of squares of deviations from actual values. The trend is represented by a straight-line equation:

$$Y = a + bx$$

Merits:

1. Most accurate and scientific method.
2. Uses all observations.
3. Suitable for forecasting future values.

18. a) Features of a Good Research Design

A good research design has the following features:

1. Clear statement of objectives.
2. Simple and systematic structure.
3. Flexibility to accommodate changes.
4. Minimizes bias and errors.
5. Economical in time and cost.

b) Important Concepts Related to Research Design

1. **Dependent and Independent Variables:** Variables under study.
2. **Research Hypothesis:** Tentative assumption to be tested.
3. **Sampling Design:** Method of selecting sample units.
4. **Observation Design:** Way of collecting data.
5. **Statistical Design:** Plan of data analysis.

19. a) Random Sampling and its Merits

Random Sampling is a method where **each unit in the population has an equal chance of selection**.

Merits:

1. Free from personal bias.
2. Simple and scientific method.
3. Representative of the population.
4. Suitable for large populations.

b) Methods of Sampling

Sampling methods are broadly classified into:

1. Probability Sampling:

- Simple Random Sampling
- Stratified Sampling
- Systematic Sampling
- Cluster Sampling

2. Non-Probability Sampling:

- Convenience Sampling

- Judgment Sampling
- Quota Sampling

20. a) Functions and Publications of Statistical Organization of India

The Central Statistical Office (CSO) **and** National Sample Survey Office (NSSO) are major statistical organizations in India.

Functions:

1. Collection and compilation of statistical data.
2. Preparation of national income estimates.
3. Conducting large-scale surveys.
4. Advising the government on statistical matters.

Publications:

- National Accounts Statistics
- Statistical Abstract of India
- Economic Census Reports
- NSS Reports

b) Methods of Collecting Population Census Data in India (5 marks)

Population Census data in India is collected mainly through:

1. **House-listing Method:** Listing houses and households.
2. **Individual Enumeration Method:** Collecting personal details of each individual through schedules filled by enumerators.