



LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – STATISTICS

SECOND SEMESTER – APRIL 2025

PST2MC04 – RESEARCH METHODOLOGY



Date: 02-05-2025

Dept. No.

Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

SECTION A – K1 (CO1)

Answer ALL the questions (5 x 1 = 5)

1 Fill in the blanks

- The blueprint or framework that guides a research study is called _____.
- Practical considerations in sampling include cost, time, and _____ of the population being sampled.
- The systematic examination of previous research work related to a topic is called _____.
- The statistical technique that involves drawing repeated samples from observed data is called _____.
- The document preparation system widely used for formatting research papers is _____.

SECTION A – K2 (CO1)

Answer ALL the questions (5 x 1 = 5)

2 Define the following

- Applied Research.
- Sample Size Determination.
- Review of Literature.
- MCMC Methods.
- Plagiarism.

SECTION B – K3 (CO2)

Answer any THREE of the following (3 x 10 = 30)

- Discuss the different types of research with suitable examples.
- A company aims to estimate the average weight of its product. The population standard deviation is known to be 0.55 kg, and the company wants to determine the mean weight with a 95% confidence level, ensuring a margin of error of 0.1 kg. Consider the following scenarios:
Scenario 1: If the population is assumed to be infinite, determine the required sample size.
Scenario 2: If the population size is 2000, calculate the necessary sample size.
- Discuss the concepts of reliability and validity. Explain the methods used to assess them.
- Explain the procedure of Monte Carlo Simulation method.
- Discuss the importance of research tools and techniques in conducting effective research.

SECTION C – K4 (CO3)**Answer any TWO of the following****(2 x 12.5 = 25)**

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| 8 | Explain the meaning, objectives, and significance of research in detail. |
| 9 | Compare and contrast probability and non-probability sampling techniques with examples. |
| 10 | What are bootstrap and jackknife methods? Explain their applications in statistical analysis. |
| 11 | Explain the role of LaTeX and MS Office in research paper formatting. |

SECTION D – K5 (CO4)**Answer any ONE of the following****(1 x 15 = 15)**

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| 12 | Discuss different methods of data collection, highlighting their advantages and disadvantages. |
| 13 | Explain the Expectation-Maximization (EM) algorithm and its use in handling missing data. |

SECTION E – K6 (CO5)**Answer any ONE of the following****(1 x 20 = 20)**

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| 14 | Describe in detail the various steps involved in the research process. |
| 15 | Define measurement and scaling. Explain different types of scales used in research with examples. |

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