



QP CODE: 25050633



25050633

Reg No :

Name :

MSc DEGREE (CSS) EXAMINATION DECEMBER 2025

First Semester

Core Courses - ST500103 - SAMPLING THEORY

M Sc STATISTICS, MSc APPLIED STATISTICS, MSc STATISTICS WITH DATA SCIENCE

2019 Admission Onwards

D8BE4B9A

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. What are the advantages of sampling over census?
2. Distinguish between probability sampling and non probability sampling.
3. Write the confidence interval for population mean and population total.
4. Explain optimum allocation.
5. Compare systematic sampling with simple random sampling.
6. P.T in systematic sampling with interval k , sample mean is an unbiased estimator of the population mean.
7. Show that the ratio estimators are biased.
8. Define Hartly-Ross estimator.
9. Briefly explain PPS sampling.
10. Explain Murthy's unordered estimator.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Explain the principal steps in conducting a sample survey.
12. In SRSWOR, derive an unbiased estimate of the population total.
13. Distinguish between proportional allocation and Neyman allocation.
14. Compare systematic sampling with random sampling.
15. Find the bias and variance of regression estimator for estimating population total.





16. Compare cluster sampling with stratified sampling
17. Explain Lahiri's method of selecting a PPS sample and point out its merits.
18. Find an unbiased estimator of the population total in PPS wr. Also find its sampling variance.
(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

Weight 5 each.

19. Show that under SRSWOR, the sample mean $\bar{y}$ is an unbiased estimator of the population mean $\bar{Y}$.
Prove that $V(\bar{y}) = (1 - f)S^2/n$. Also find an unbiased estimator for $V(\bar{y})$.
20. Suggest an unbiased estimator of the population mean in case of stratified random sampling. Derive its variance and deduce it under proportional and Neyman allocations.
21. What is meant by linear regression estimator for the population mean? Compare the efficiency of the regression estimator with those based on mean per unit and ratio estimation procedure.
22. Distinguish between ordered and unordered estimators in ppswor. Define Horwitz–Thomson estimator and derive its estimated SE.

(2×5=10 weightage)

