25P256 (Pages: 2) Name: .....

Reg.No: .....

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2026

(CBCSS - PG)

(Regular/Supplementary/Improvement)

CC22PMST2C07 - SAMPLING THEORY

(Statistics)

(2022 Admission onwards)

Time : 3 Hours Maximum : 30 Weightage

Part-A

Answer any ***four*** questions. Each question carries 2 weightage.

1. What is Mean Square Error?
2. Explain the principles of Sampling Theory.
3. Describe about linear systematic sampling. State its advantages.
4. Define stratified sampling. State its advantages.
5. Define PPS sampling with replacement.
6. What do you mean by Zen-Midzuno method of sampling?
7. Distinguish between multistage sampling and multiphase sampling.

(4 × 2 = 8 Weightage)

Part-B

Answer any ***four*** questions. Each question carries 3 weightage.

8. Prove that in SRSWR, probability of i^{th} unit is selected in the r^{th} draw and j^{th} unit is selected at the s^{th} draw is $\frac{1}{N^2}$.
9. Carry out a comparison between systematic sampling, stratified sampling and simple random sampling in the case of a population with linear trend.
10. Estimate the relative gain in precision for proportional allocation over SRS.
11. Define regression estimator. Compare ratio and regression estimators in stratified sampling.
12. Explain Basu-Murthy's unordered estimate of population mean. Derive its variance.
13. Obtain the mean and variance in case of equal cluster sampling.
14. Give any three estimators of population mean in cluster sampling where clusters are of unequal size and discuss their properties.

(4 × 3 = 12 Weightage)

Part-C

Answer any ***two*** questions. Each question carries 5 weightage.

15. Propose an unbiased estimator of the population mean and write down its variance under SRSWOR and SRSWR.

16. Give any three estimators of population mean in cluster sampling where clusters are of unequal size and discuss their properties.

17. Define ratio estimator. Derive its first approximation to the relative bias of ratio estimator in SRSWOR.

18. Derive the expression for variance of cluster mean where clusters are of equal size in terms of intra class correlation coefficient and carry out a comparison with simple random sample.

(2 × 5 = 10 Weightage)

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