INTEGRATED MSC DEGREE EXAMINATION, MAY 2024

Seventh Semester

INTEGRATED MSC BASIC SCIENCE-STATISTICS

CORE - IST7CR03 - SAMPLING THEORY

2020 Admission Onwards

48F11B4D

Time: 3 Hours   Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. What is the importance of Official Statistics?

2. What do you understand by random sampling?

3. What is Bias of an estimator?

4. Explain proportional allocation in stratified sampling.

5. What is systematic Sampling method?

6. Explain ratio method of estimation.

7. Explain two- stage cluster sampling with an example.

8. What is the difference between multisatage and multi phase sampling?

9. What do you mean by Varying Probability sampling?

10. Distinguish between Ordered estimator and Unordered estimators.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. What is CSO and what are its activities?

12. Derive the expression for the variance of $\hat{Y}_{tot}$ in both SRS WR and SRS WOR. Where $\hat{Y}_{tot}$ it the estimator for the population total.

13. Derive an unbiased estimator for the population mean $\bar{Y}$ in stratified random sampling. Also find an unbiased estimator for population total.

14. Derive an unbiased estimator for population mean and its estimated variance in systematic sampling.

15. Derive the variance of the ratio estimate of population mean.

16. Compare the variance of simple regression estimate and ratio estimate .

17. Explain Cumulative total method with an example.

18. Describe Horvitz-Thompson estimator.

<div align="right">(6×2=12 weightage)</div>

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Derive the confidence interval for population mean and population proportion in SRS.

20. Compare the variance of estimator of population mean under SRS and Systematic Sampling.

21. Derive an expression for the approximated bias in the estimator of the population ratio.

22. Describe Des-Raj's ordered estimator and show that it is unbiased for population mean in PPS WOR.

<div align="right">(2×5=10 weightage)</div>