



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – STATISTICS

THIRD SEMESTER – APRIL 2017

ST 3505 / ST 3504 - SAMPLING THEORY

Date: 02-05-2017
09:00-12:00

Dept. No.

Max. : 100 Marks

Part – A

Answer **ALL** the questions

(10*2=20 Marks)

1. Define finite population with an example.
2. Define mean square error.
3. Define simple random sampling with replacement.
4. Show that in SRSWOR the sample mean is unbiased estimator of population mean.
5. Explain stratified random sampling.
6. Write any two principles of stratification.
7. Is systematic sampling superior to simple random sampling and stratified random sampling?
Comment.
8. List all possible circular systematic samples when $N=24$, $n=6$ and $k=4$ and give your comments.
9. Define: Ratio estimator.
10. What is the use of auxiliary information?

Part – B

Answer any **FIVE** questions

(5*8=40 Marks)

11. Discuss the merits and demerits of sample surveys.
12. Distinguish between probability sampling and non-probability sampling. What are their advantages and disadvantages?
13. Prove that in stratified sampling, sample mean is unbiased estimator of population mean.
14. In usual notations, prove that the systematic sample mean is more precise than mean of SRSWOR if $S^2_{wsy} > S^2$.
15. Derive the approximate bias and mean square error of the ratio estimator.
16. Explain the causes of non- sampling errors.

Part – C

Answer any **TWO** questions

(2*20=40 Marks)

17. Explain in detail about the principal steps involved in the planning and execution of a sample survey.
18. Derive $V(\bar{y})$ under SRSWOR and obtain its unbiased estimator.
19. (a) Compare ratio and regression estimators.
(b) Write a note on lottery and Random number tables method for collecting a simple random sample.
20. (a) If the population consists of linear trend, then prove that $V(\bar{y}_{st}) \leq V(\bar{y}_{sys}) \leq V(\bar{y}_R)$.
(b) Explain the advantages and disadvantages of systematic sampling.
