



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – STATISTICS

THIRD SEMESTER – NOVEMBER 2014

ST 3505/3504/3502/4500 - SAMPLING THEORY

Date : 31/10/2014
Time : 09:00-12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer **ALL** the questions:

(10x2=20 Marks)

1. State any two applications of sampling theory.
2. Distinguish between census and sample surveys.
3. What are non-sampling errors and their sources?
4. Prove that $V(\bar{y}) = \frac{\sigma^2}{n}$.
5. Prove that sample mean is an unbiased estimator of the population mean.
6. Explain any two principles of stratification.
7. Give the methods of allocation of sample sizes to different strata.
8. Define systematic sampling.
9. Derive the variance of the mean of a systematic sample.
10. Define ratio estimator.

PART – B

Answer any **FIVE** questions:

(5x8=40 Marks)

11. Discuss briefly the basic principles of a sample survey.
12. List out the dangers in Statistical packages.
13. In SRSWOR, prove that the sample mean square is an unbiased estimator of population mean square.
14. What is proportional allocation? State the properties of the conventional estimator under “Proportional Allocation”?
15. Develop linear regression estimator with the help of results available in linear regression model.
16. With the usual notations, prove that $V(\bar{y}_n)_R \geq V(\bar{y}_{st})_P$.
17. Compare ratio and regression estimators.
18. Explain the following terms (i) population (ii) Sample (iii) Population Parameter and (iv) Sample Statistic with suitable illustration.

PART – C

Answer any **TWO** questions:

(2x20=40 Marks)

19. Derive $V(\bar{y})$ under SRSWOR and obtain its unbiased estimator.
20. (a) Write a note on simple random sampling of attributes.
(b) Derive any two properties of sample mean in SRSWR.
21. (a) Compare $V_{prop}(\bar{y}_n)$ and $V_{Neyman}(\bar{y}_{st})$.
(b) Derive the variance of the sample mean per element in terms of intra cluster correlation in cluster sampling.
22. (a) Explain Regression estimation in stratified sampling.
(b) Write a note on combined and separate ratio estimator.

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