LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc., DEGREE EXAMINATION – **STATISTICS**

FOURTH SEMESTER – **APRIL 2015**

ST 4500 – BASIC SAMPLING THEORY

Date : 27/04/2015 Dept. No. Max. : 100 Marks
Time : 09:00-12:00

PART – A

Answer **ALL** questions: **(10x2=20 Marks)**

1. What are non-sampling errors?
2. What is the difference between a Parameter and a statistic?
3. What is a random number table?
4. Define simple random sampling with an example.
5. Write any two principles of stratification.
6. Define proportional allocation in stratified sampling with an illustration.
7. Define: Systematic sampling.
8. List all possible circular systematic samples when N=11, n=4 and k=3 and give your comments.
9. Define: Ratio estimator.
10. What do you mean by "Population with linear trend"?

PART – B

Answer any **FIVE** questions: **(5x8=40 Marks)**

11. Suggest an estimator for population mean in stratified sampling and check whether it is unbiased.
12. Discuss briefly the basic principles of a sample survey.
13. Give the formula for estimating standard error in the estimation of finite population total using SRSWR.
14. Prove that sample mean is unbiased estimator of population mean and also find the variance of the sample mean.
15. In usual notations, prove that the systematic sample mean is more precise than the mean of SRSWOR if $S^2_{wsy} > S^2$.
16. What are the advantages of sampling over census method?
17. Write a note on sampling of attributes.
18. Explain the following: (i) Optimum Allocation and (ii) Neymann Allocation.

PART – C

Answer any **TWO** questions: **(2x20=40 Marks)**

19. (a) Explain the sources of non-sampling errors.
    (b) Write the limitations of sample survey.
20. (a) If the population consists of linear trend, then prove that $V(\bar{y}_{st}) \le V(\bar{y}_{sys}) \le V(\bar{y}_R)$.
    (b) In SRSWOR find $V(\bar{y}_n)$.
21. (a) Compare ratio and regression estimators.
    (b) Write a note on combined and separate ratio estimators.
22. Write short notes on the following: (i) mean squared error (ii) Estimation of population mean (iii) Linear and circular systematic sampling and (iv) Questionnaire and schedules.

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