LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – **APRIL 2016**

ST 3505/ST 3504/ST 3502/ST 4500 – SAMPLING THEORY

Date: 05-05-2016 Dept. No. Max. : 100 Marks

Time: 09:00-12:00

Part – A

Answer **ALL** the questions **(10*2=20 Marks)**

1. What is population and sample?
2. Write down the advantages of sampling over census method.
3. Define simple random sampling without replacement.
4. Distinguish between SRSWR and SRSWOR.
5. Distinguish between a questionnaire and schedule
6. Describe any two principles of stratification.
7. Define stratified random sampling.
8. Define ratio estimator.
9. Derive the variance of the mean of a systematic sample.
10. What is meant by circular sampling?

Part – B

Answer any **FIVE** questions **(5*8=40 Marks)**

11. Explain what you understand by probability sampling and non-probability sampling. What are their advantages and disadvantages?
12. Derive any two properties of sample mean in SRSWR.
13. In SRSWOR, prove that the sample mean square is an unbiased estimator of population mean square.
14. In usual notations, prove that the systematic sample mean is more precise than mean of SRSWOR if $S^2_{wsy} > S^2$
15. Explain linear regression estimator with the help of results available in linear regression model.
16. Distinguish between regression and ratio estimators.
17. A simple random sample of 30 households was drawn from a city area containing 14,848 households. The no. of persons per household in the sample were as follows:

5	6	3	3	2	3	3	3	4	4	3	2	7	4	3
5	4	4	3	3	4	3	3	1	2	4	3	4	2	4

Estimate the total no. of people in the area.

18. Explain the advantages and disadvantages of systematic sampling.

Part – C

Answer any **TWO** questions **(2*20=40 Marks)**

19. (a) What are non-sampling errors? Explain its sources.
    (b) How sample size are determined in "multi item" studies.
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) Explain proportional allocation and optimum allocation
21. Define systematic sampling. Obtain the sampling variance of the mean and compare with SRSWOR and stratified sampling.
22. (a) a) Develop a linear regression estimator with the help of results available in linear regression models.
    (b) Explain Ratio estimation in simple random sampling.

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