# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – **NOVEMBER 2019**

## ST 3505 – SAMPLING THEORY

Date: 29-10-2019     Dept. No.                    Max. : 100 Marks
Time: 01:00-04:00

## SECTION – A

**Answer ALL questions.  Each carries TWO marks.**          **(10 x 2 = 20 marks)**

1. What is meant by (i) population, (ii) population size, (iii) sample, (iv) sample size?

2. Explain 'parameter' and 'statistic' with an example for each.

3. What is meant by Sampling Distribution?

4. Define Standard Error (S.E.).  Give the S.E. of any two statistics.

5. Name any four random number tables which are commonly used in practice.

6. What is meant by 'Sampling Frame'?

7. Explain the term 'Pretest' in sample survey.

8. In SRSWOR, if the sample size is increased, what will happen to V ($\bar{y}$)?

9. Under what situation stratified sampling is used?

10. Mention the merits of systematic sampling.

## SECTION – B

**Answer any FIVE questions.  Each carries EIGHT marks.**          **(5 x 8 = 40 marks)**

11. State the advantages of sampling over complete census.

12. In SRSWOR, find the probability of (i) selecting a specified unit of the population at

    any given draw and (ii) including any specified unit in the sample.

13. In SRSWOR, show that sample mean square is unbiased for population mean square.

14. In SRS of attributes, find (i) E (p), (ii) Var (p), (iii) v (p), and (iv) Var ($\hat{A}$).

15. In Stratified Random Sampling, find the mean and variance of the estimate $\bar{y}_{st}$ of the population mean $\bar{Y}_N$.

16. In Systematic Sampling, derive the formula for Var ($\bar{y}_{sys}$) using $S^2$ and $S^2_{wsy}$.

17. Show that Systematic Sampling would be more efficient as compared with SRSWOR if     < -1 / (nk – 1).

18. Write the merits and demerits of Systematic Sampling.

## SECTION – C

**Answer any TWO questions.  Each carries TWENTY marks.**          **(2 x 20 = 40 marks)**

19. Discuss in detail the main steps involved in the planning and execution of a sample survey.

20. Compare 'stratified random sampling' with 'simple random sampling' and prove that

    Var($\bar{y}_n$)$_R$     Var($\bar{y}_{st}$)$_P$     Var($\bar{y}_{st}$)$_N$.

21. In the presence of general linear trend in the population, prove that Var ($\bar{y}_{st}$) : Var ($\bar{y}_{sys}$)     Var ($\bar{y}_n$)$_R$.

22. Discuss Circular Systematic Sampling with an example and state its advantages.

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