B. Sc. DEGREE END SEMESTER EXAMINATION - MARCH 2020

SEMESTER – **4**: STATISTICS (CORE COURSE FOR COMPUTER APPLICATIONS)

COURSE: **15U4CRCST5 – SAMPLE SURVEY ANALYSIS AND DESIGN OF EXPERIMENTS**

(For Regular - 2018 Admission and Supplementary / Improvement 2017, 2016, 2015 Admissions)

Time: Three Hours   Max. Marks: 75

Use of scientific calculators and statistical tables are permitted

PART A

Answer **all** questions. Each question carries **1** mark.

1. Distinguish between census and sample method.

2. Explain the fields of application of sampling techniques.

3. Name any two non-probability sampling methods.

4. What is meant by Neyman allocation?

5. What is Latin Square Design?

6. Define stratified random sampling.

7. State the assumptions used in ANOVA.

8. What are the requirements of a good experimental design?

9. What are the advantages of CRD?

10. In stratified random sampling, give an unbiased estimator of the population mean $\bar{Y}$.

(1 x 10 = 10)

PART B

(Each question carries **3** marks. Maximum marks from this part is 15)

11. Compare the efficiency of sample mean under SRSWOR over SRSWR

12. Describe sampling and non- sampling errors.

13. Distinguish between simple random sampling with and with out replacement.

14. Give the Confidence limits for the population mean in SRS.

15. What are the advantages of stratification?

16. Briefly explain the Analysis of variance of one way classification.

17. What are the usual assumptions made in the analysis of Randomized block design?

PART C

(Each question carries **5** marks. Maximum marks from this part is 20)

18. Show that the probability of selecting a specified unit in any draw is the same as the probability of selecting that unit in the first draw in a *SRSWOR.*

19. Explain the methods of simple random sampling.

20. Show that an estimator $\overline{y_{st}}$ is an unbiased estimator of the population mean and find its variance.

21. Explain the layout of RBD . In which situation we use it?

22. Derive the efficiency of LSD compared to RBD.

23. What do you understand by local control? Explain its role in experimental design.

PART D

(Each question carries **10** marks. Maximum marks from this part is 30)

24. Explain optimum allocation and compare it with simple random sampling .

25. Show that under SRSWOR, the sample mean $\bar{y}$ is an unbiased estimator of the population mean $\bar{Y}$. Prove that $V(\bar{y}) = (1 - f)\frac{S^2}{n}.$

26. Analyse the following results

    A (12)   D (20)   C (16)   B (10)

    D (18)   A (14)   B (11)   C (14)

    B (12)   C (15)   D (19)   A (13)

    C (16)   B (11)   A (15)   D (20)

    The letters A,B,C and D denote the treatments and the figures in brackets denote the observations.

27. What are the fundamental principles of experimentation?

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