



K23U 0539

Reg. No. :

Name :

**VI Semester B.Sc. Degree (CBCSS – OBE – Regular/Supplementary/
Improvement) Examination, April 2023
(2019 and 2020 Admissions)
CORE COURSE IN STATISTICS
6B12STA – Sampling Techniques and Design of Experiments**

Time : 3 Hours

Max. Marks : 48

**PART – A
(Short Answer)**

Answer **all** questions. **Each** question carries **one** mark).

1. Define a questionnaire.
2. Write any two advantages of pretest.
3. What is lottery method ?
4. What are the various methods of allocating a sample in stratified sampling ?
5. Define analysis of variance.
6. Define fixed effect model in ANOVA. (6×1=6)

**PART – B
(Short Essay)**

Answer **any 7** questions. **Each** question carries **two** marks.

7. Define sample frame and sampling unit.
8. Show that in SRSWOR, the sample mean is an unbiased estimate of the population mean.
9. Define stratified random sampling.
10. What are the advantages of stratified random sampling over simple random sampling ?
11. Explain circular systematic sampling.
12. What are the assumptions used in ANOVA ?

P.T.O.

K23U 0539



13. Define completely randomized design.
14. What are the advantages and disadvantages of randomized block design ?
15. What do you understand by 'analysis of covariance' ? State the assumptions of ANCOVA. (7×2=14)

**PART – C
(Essay)**

Answer **any 4** questions. **Each** question carries **4** marks.

16. Define sampling error. What are the situations under which sampling errors occur ?
17. Show that in SRSWOR, the sample mean square is an unbiased estimate of the population mean square.
18. Show that systematic sampling is more efficient than SRSWR.
19. Explain the concept of design of experiments.
20. Explain the missing plot technique used in randomized block design.
21. Define efficiency of designs. Obtain the efficiency of LSD relative to RBD. (4×4=16)

**PART – D
(Long Essay)**

Answer **any 2** questions. **Each** question carries **6** marks.

22. i) Explain the advantages of sampling over complete census.
ii) Explain the types of sampling.
23. Show that in SRSWR, the variance of the sample mean is given by

$$\text{Var}(\bar{y}_n) = \frac{(N-1)}{nN} S^2.$$
24. i) Explain the procedure for estimating one missing observation in RBD.
ii) Explain the principles of experimental design.
25. Develop the statistical analysis of LSD. (2×6=12)