



K25U 0184

Reg. No. :

Name :

**Sixth Semester B.Sc. Degree (C.B.C.S.S. – OBE – Regular/Supplementary/
Improvement) Examination, April 2025
(2019 to 2022 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. (6×1=6)

1. Name any two types of allocation in stratified random sampling.
2. Give one advantage of systematic sampling.
3. What is ANOVA ?
4. What do you mean by a fixed effects model ?
5. What are comparative experiments ?
6. Which basic principle of experimentation is used to get rid of subjective bias in allocating treatments ?

**PART – B
(Short Essay)**

Answer **any 7** questions. **Each** question carries **two** marks. (7×2=14)

7. Define simple random sampling.
8. Give a real life example where stratified sampling method is applicable.
9. Explain circular systematic sampling.
10. Explain the concept of analysis of covariance.
11. What do you mean by one way classified data ?
12. Explaining clearly the terms, write down the model for a two way classified data.
13. What are the assumptions in analysis of variance ?
14. What do you mean by replication ?
15. What are complete block designs ? Give an example.

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**PART – C
(Essay)**

Answer **any 4** questions. **Each** question carries **4** marks. (4×4=16)

16. What are the advantages of sampling over census ?
17. Show that in stratified random sampling, the sample mean is an unbiased estimator of the population mean.
18. In linear systematic sampling, how will you determine the sampling interval k ?
19. Complete the following ANOVA table :

Source of Variation	Degrees of freedom	Sum of squares	Mean square	F
Treatment		215.25		
Block	3			
Error		130.50		
Total	19	458.50		

20. In the context of design of experiments, what do you mean by the term treatment ? Illustrate with an example.
21. When do you use a Latin square design instead of a randomized block design ?

**PART – D
(Long Essay)**

Answer **any 2** questions. **Each** question carries **6** marks. (2×6=12)

22. What are the principal steps in a sample survey ?
23. With usual notations, show that $V(\bar{Y}_{prop}) \leq V(\bar{Y}_{ran})$.
24. Explain the analysis of a one-way classified data.
25. Define efficiency of a design. Derive the expression for the efficiency of a Latin square design with respect to that of a randomized block design.