# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SIXTH SEMESTER – **APRIL 2023**

**UST 6501 – DESIGN AND ANALYSIS OF EXPERIMENTS**

Date: 29-04-2023          Dept. No.          Max. : 100 Marks
Time: 09:00 AM - 12:00 NOON

## PART – A                                      (10x 2 = 20 Marks)

**Answer ALL questions**

1. Define Orthogonal contrasts.
2. Differentiate fixed effect model and random effect model.
3. State Cochran's theorem.
4. What is ANOCOVA technique?
5. What is meant by uniformity trial?
6. Discuss Tukey's test.
7. What are the advantages of factorial designs?
8. What is meant by confounding?  Why is it necessary?
9. What is an incidence matrix?
10.  When is a BIBD said to be symmetric?

## PART - B

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

11. Explain basic principles of experimental design.

12. Discuss the various steps in the ANOVA testing for fixed effect model of one way classified data.

13. Obtain the expression for one missing value in Randomised Block Design.

14. Derive the expression to measure the efficiency of LSD over CRD

15. Give the statistical analysis of $3^2$ factorial experiment.

16. Distinguish between Complete and Partial Confounding.

17. Define BIBD.  State the important relations among the parameters of a BIBD and prove any two of them.

18. In a symmetric BIBD, prove that the number of treatments common between any two blocks is λ.

## PART - C

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

19.  Develop the complete Statistical analysis of two way classified data with one observation per  cell.  Discuss the advantages of this method  over one way classification.

20. Give the complete statistical analysis of LSD.  List its advantages and disadvantages.

21. Give the statistical analysis of $2^3$ Factorial Experiments. Show that in $2^3$ experiment the main and interaction effects are mutually orthogonal.

22.  Discuss in detail the analysis of a BIBD using intra-block information.

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