



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

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

**SIXTH SEMESTER – APRIL 2022**

**17UST6MC02 – DESIGN AND ANALYSIS OF EXPERIMENTS**

Date: 17-06-2022

Dept. No.

Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

**PART – A**

**Answer ALL questions:**

**(10x 2 = 20 Marks)**

1. Define the term replication.
2. What is comparative experiment?
3. Define mixed effect model.
4. When do we prefer randomized block design?
5. Write the layout of standard 5 x 5 Latin square design.
6. Give the statistical model for LSD.
7. Define main effect and interaction effect  $2^2$  in factorial experiment.
8. List all the treatment combinations of a  $3^2$  factorial design
9. What do you understand by partial confounding?
10. Define BIBD with usual notations.

**PART - B**

**Answer any FIVE questions**

**(5 x 8 = 40 Marks)**

11. Distinguish between fixed effect model and random effect model with suitable illustrations.
12. Explain the three principles of experimental design.
13. Prove that mean sum of squares due to treatments, provides an unbiased estimate of  $\sigma_e^2$  for two way analysis of variance.
14. Write the advantages and disadvantages of LSD.
15. Derive the formula for estimating the single missing observation in RBD.
16. Describe  $2^2$  factorial experiment and develop its statistical analysis.
17. Explain confounding in detail.
18. Prove that  $\lambda(v - 1) = r(k - 1)$  in balanced incomplete block design.

**PART - C**

**Answer any TWO questions**

**(2 x 20 = 40 Marks)**

19. Develop the complete Statistical analysis of CRD.
20. Describe in detail the preparation of layout for a Latin Square Design and the steps involved in analysis of LSD.
21. Describe, the analysis of variance for a  $2^3$  factorial design, stating all the hypothesis, ANOVA and conclusions.
22. Explain Balanced Incomplete Block Design and describe in detail the intra-block analysis for the same.

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