LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SIXTH SEMESTER – **NOVEMBER 2022**

UST 6501 – DESIGN AND ANALYSIS OF EXPERIMENTS

Date: 01-12-2022   Dept. No.   Max. : 100 Marks
Time: 01:00 PM - 04:00 PM

PART – A

Answer ALL the Questions   **(10x 2 = 20 Marks)**

1. What is an experimental design?
2. How do you define an experimental unit?
3. Define yield with an illustration.
4. Write any two advantage of C.R.D.
5. Give the layout of R.B.D.
6. Write the formula for single missing observation in LSD.
7. When do you use Factorial Experiments?
8. Define partial confounding.
9. Prove that $vr = bk$ in BIBD.
10. Write the error degrees of freedom for BIBD.

PART - B

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

11. Explain the following with illustrations.
    a) Replication
    b) Randomization
    c) Local Control
12. Write the advantages, disadvantages and application of randomized block design.
13. Prove that mean sum of squares due to treatments, provides an unbiased estimate of σ_e^2 for one way analysis of variance.
14. Derive the formula for estimation of single missing value in R.B.D.
15. Elucidate the random effect model.
16. Explain the Yates' method of computing factorial effect totals in a 2^3 factorial experiment and outline its statistical analysis.

17. Distinguish between Complete confounding and Partial Confounding.
18. Prove that λ (v – 1) = r (k − 1) in BIBD.

PART - C

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

19. Derive the complete statistical analysis of one way analysis of variance.
20. Describe in detail the preparation of layout for a Latin Square Design and the steps involved in its analysis.
21. a) Explain in detail the analysis of 2^2 factorial experiments.

    b) Derive the expression to measure the efficiency of RBD over CRD.

22. Develop the inter – block analysis of a BIBD stating the model, Hypothesis, ANOVA and inference.

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