LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SIXTH SEMESTER – **APRIL 2024**

UST 6501 – DESIGN AND ANALYSIS OF EXPERIMENTS

Date: 01-04-2024 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

SECTION-A

Answer ALL the questions. **(10 x 2 = 20)**

1. Define contrast and give an example.
2. What is random effect model? Give an example.
3. State the importance of local control technique.
4. What are the demerits of a completely randomized design?
5. What is Latin square design?
6. How do we identify that confounding is done? Explain with an example.
7. Write any two applications of factorial experiment.
8. Define BIBD.
9. What is Mutually Orthogonal Latin square design?
10. What is the role of incidence matrix in BIBD?

SECTION-B

Answer any FOUR questions. **(4 x 10 = 40)**

11. What are the basic principles of experimental design? Explain with examples.
12. Explain one way classification model.
13. Estimate two missing values in RBD.
14. Obtain the expression for the efficiency of LSD over RBD.
15. Derive the Statistical analysis of 2^2 Factorial Design.
16. Assume that in a one-way analysis of variance, the null hypothesis is rejected. What should we do in this circumstance? Give a thorough explanation.
17. Establish the parametric conditions of BIBD.
18. Construct balanced incomplete block design using Mutually orthogonal Latin square design when s=3.

SECTION-C

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

19. (a) Write the advantages and disadvantages of RBD.
    (b) Write in detail about the linear design model with examples. **(10+10)**

20. Explain the concept and analysis of LSD with a layout.

21. (a) Explain the types of confounding.

(b) Consider the results given in the following table for an experiment involving six treatments in four blocks. The treatments are indicated by numbers within parentheses.

Blocks	Yield					
1	24.7(1)	27.7(3)	20.6(2)	16.2(4)	16.2(5)	24.9(6)
2	22.7(3)	28.8(2)	27.3(1)	15.0(4)	22.5(6)	17.0(5)
3	26.3(6)	19.6(4)	38.5(1)	36.8(3)	39.5(2)	15.4(5)
4	17.7(5)	31.0(2)	28.5(1)	14.1(4)	34.9(3)	22.6(6)

Test whether the treatments differ significantly. **(8+12)**

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

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