



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – STATISTICS

SIXTH SEMESTER – APRIL 2015

ST 6603/ST 6600 - DESIGN AND ANALYSIS OF EXPERIMENTS

Date : 21/04/2015
Time : 09:00-12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer ALL the questions:

(10x2=20 marks)

1. When are two contrasts said to be mutually orthogonal? Give an example.
2. What are the assumptions in ANOVA.
3. Mention the sources of experimental error.
4. Write down the hypothesis of interest in a two-way classification with more than one observation per cell.
5. Write down the mathematical model for a LSD.
6. When is multiple comparison tests applied in ANOVA?
7. State the advantages of factorial experiment over a simple experiment.
8. What is meant by complete confounding?
9. When is a BIBD said to be symmetric?
10. Construct a BIBD with $v=4$, $b=6$, $k=2$, $r=3$ and $\lambda=1$ in the usual notations.

PART – B

Answer any FIVE questions:

(5x8=40 marks)

11. Explain the principles of replication and local control in design of experiments.
12. Give the fixed effect mathematical model for one-way classification and obtain the least square estimates of the parameters in the model.
13. Outline the procedure for critical difference method.
14. Obtain an expression for the efficiency of RBD over CRD.
15. Explain the Yates' method of computing factorial effect totals in a 2^2 factorial experiment and outline its statistical analysis.
16. Complete the following ANOVA table of the LSD:

Sources of variation	Sum of squares	Degrees of freedom	Mean square	F-ratio
Rows	72	-	-	1.5
Columns	-	-	36	-
Treatments	180	-	-	-
Error	-	6	12	
Total	-	-		

17. In testing the value of three fertilizers N, P, K each at two levels, eight pairs of blocks of 4 plots are used. The treatments (n, p, k, npk) are put in one block. What should be the composition of the other block for completely confounding the interaction effect. Give the ANOVA table for this confounded factorial design.
18. Define a BIBD and establish the relationships among its parameters.

PART – C

Answer any TWO questions:

(2x20=40 marks)

19. Why does missing plot arise in design of experiments? How will you estimate a missing observation in a RBD layout? Explain the subsequent analysis.
20. Give the layout and complete analysis of a Latin Square Design.
21. Describe a 3^2 factorial experiment and develop its statistical analysis.
22. Discuss in detail the intra-block analysis of BIBD.

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