

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



M.Sc.DEGREE EXAMINATION –STATISTICS

FOURTH SEMESTER – APRIL 2018

16PST4MC01 / ST 4813 – APPLIED EXPERIMENTAL DESIGNS

Date: 18-04-2018

Dept. No.

Max. : 100 Marks

Time: 01:00-04:00

SECTION – A

Answer ALL the questions

(10 x 2 = 20 Marks)

1. In a 2^2 factorial design with $(1)=35$, $a= 40$, $b=50$, $ab=42$ obtain the interaction effect AB.
2. Write the regression model for a 2^2 design with low level and high level represented by -1 and 1.
3. What is the Expectation of Mean Sum of Squares due to treatment in a Latin Square Design with p rows?
4. Verify whether the following could be the parameters of a BIBD. $v=11$, $b=22$, $r=6$, $k=3$, $\lambda = 1$. Justify.
5. Write the expression for a residual in a Randomized Block Design.
6. Explain the application of half normal probability plot.
7. Explain confounding in factorial design.
8. Define orthogonal contrast. Write the expression for a sum of squares due to a contrast.
9. Explain the need for 3^2 design.
10. Define a concomitant variable.

SECTION – B

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

11. Write the linear model used for a Graeco Latin Square Design. Also write the ANOVA table.
12. Write the 3 orthogonal Latin Squares of order 4 using GF (2^2).
13. Explain the uses of a contour plot and response surface in a factorial design.
14. Write the analysis of a 2 factor model with random effects.
15. In a 3^2 factorial design the following results are obtained in a single replication.

Levels		A		
		0	1	2
B	0	-3	2	1
	1	-2	-2	2
	2	1	1	1

Obtain the sum of squares due to AB and AB^2 .

16. In a 2^4 factorial experiment the principal block is given by (1), ad, ab, abcd. Write down the other blocks and the confounded effects.
17. Explain the method of analysis for ANCOVA in a Completely Randomized Design.
18. Explain the different methods of confirming the results in a fractional factorial design.

SECTION – C

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

19. a) Explain the analysis of a Randomized Block Design. **(12)**
- b) Obtain the efficiency of a Randomized Block Design over completely Randomized Design. **(8)**
20. a) Explain the analysis of a 2^3 factorial in a Latin Square Design. **(10)**
- b) Explain how will you construct 2^{6-2} design by using $I=ABCE$ and $I=BCDF$ as the generators. **(10)**
21. Explain the analysis of a BIBD.
22. a) Explain the analysis of a split plot design. **(15)**
- b) Explain split split plot design and strip plot design. **(5)**
