



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – STATISTICS

FOURTH SEMESTER – APRIL 2015

ST 4813 - APPLIED EXPERIMENTAL DESIGN

Date : 15/04/2015
Time : 09:00-12:00

Dept. No.

Max. : 100 Marks

SECTION – A

Answer **ALL** the questions

(10 x 2 = 20 marks)

1. Briefly explain the non-statistical principle of experimental design.
2. State the linear model used in 2^3 factorial design.
3. Give any two industrial applications of experimental designs.
4. Write the homogenous equations for ABC in 2^4 factorial experiment.
5. Define the term critical difference.
4. Briefly explain the term orthogonal data.
5. Define whole plot treatments.
6. Write GF when the number of treatment $v = 5$.
7. List all the treatment combinations of a 3^2 factorial design.
8. Define a symmetrical BIBD with an example .
9. What is meant by Intra block analysis. ?
10. State any three parametric conditions of a PBIBD.

SECTION-B

Answer any **Five** questions

(5 x 8 = 40 marks)

11. Discuss the efficiency of RBD over CRD with suitable illustration.
12. Distinguish between complete and partial confounding with an example.
13. List all the independent and generalized treatment combinations confounded in 2^5 factorial design of size 2^3 in a single replication.
14. Describe, the analysis of variance for a 3^4 factorial design, stating all the hypothesis, ANOVA and conclusions.
15. Discuss in detail fractional factorial design with suitable illustration.
16. Describe, the analysis of variance for a 2^4 factorial design, stating all the hypothesis, ANOVA and conclusions.
17. Construct MOLS when $G(F) = p^n$ when $p = 5$ and $n = 1$.
18. Develop the inter block analysis of a BIBD

SECTION-C

Answer any **Two** questions

(2 x 20 = 40 marks)

- 19a. Develop, the analysis of Covariance , stating all the hypothesis, ANOVA and conclusions.
- b. Explain the missing plot technique in LBD with an example. **(12+8 Marks)**
- 20a. Derive the block contents for ABCD in 2^4 factorial design using homogeneous equations.
- b. Develop, the analysis of variance for split plot design stating all the hypothesis, Anova and conclusions. **(8 +12Marks)**
- 21a. Construct a PBIBD with three associate classes stating all the parametric conditions .
- b. Explain Group divisible design with suitable illustration. **(12 +8 marks)**
- 22 Write short notes on the following:
- a. C-Matrix
 - b. Youden Square design.
 - c. RLSD
 - d. Steepest ascent method** **(5+5+5+5)**
