

Duration : 2 hrs

Max Marks :60

N.B. : 1) All questions are compulsory.

2) Figures to the right indicate marks for each question.

3) Use of calculators is allowed.

- Q. 1 a) i) Explain the structure of one way classification. (04)
 ii) What is analysis of variance? State the basic assumptions. (04)
- OR**
- Q. 1 a) Obtain expectations of sum of square in ANOVA two way classification. (08)
- Q. 1 b) In ANOVA two way classification, obtain least square estimators of the parameters. (08)
- OR**
- Q. 1 b) i) Explain mathematical model for one way classification. (04)
 ii) Distinguish between t-test for difference between means and ANOVA. (04)
- Q. 2 c) Define: i) Treatment ii) Plot iii) Experimental error iv) Precision (08)
- OR**
- Q. 2 c) i) Write short note on Replication. (04)
 ii) Explain in brief the concept " design of experiment". (04)
- Q. 2 d) Give the complete statistical analysis of CRD. (08)
- OR**
- Q. 2 d) i) Distinguish between RBD and CRD. (06)
 ii) Give layout of RBD for 4 treatments and 3 Blocks. (02)
- Q. 3 c) Obtain an expression of efficiency of LSD as compared with CRD. (08)
- OR**
- Q. 3 c) How you will analyse LSD with one missing observation? Derive an expression for estimator of a missing observation. (08)
- Q. 3 d) Show that all main effects and interaction effects are contrast, also prove that they are orthogonal contrast. (08)
- OR**
- Q. 3 d) Obtain factorial effect using Yate's method for 2^3 factorial experiment. (08)
- Q. 4 **Attempt any 3 of the following** (12)
- a) Obtain variance of estimate of the parameters in ANOVA one way.
- b) Explain Cochran's theorem. Write down ANOVA table for one way ANOVA.
- c) In CRD if treatment effects are significant, then how you will test significance between pairs of treatment effects.
- d) Write short note on Latin Square Design.
- e) State the advantages of factorial experiment.