Model Question Paper

Third Semester M.Sc Degree Examination (CSS)

ST3C13 - DESIGN AND ANALYSIS OF EXPERIMENTS

Time: 3 hours Total Weights: 30

Part A

(*Answer any five questions. Weightage 1 for each question.*)

1. Explain the concepts (i) Linear model and (ii) BLUE.
2. What do you mean by Gauss-Markoff setup.
3. Explain CRD.
4. Define Graceo latin square design.
5. Explain (i) Incidence matrix and (ii) C matrix in connection with a BIBD.
6. Define PBIBD with m associate classes.
7. What do you mean by asymmetrical factorial experiments?
8. What is E-optimality?

Part B

(*Answer any* five *questions. Weightage* 2 *for each question.*)

9. Develop the procedure to test the general linear hypothesis based on a linear model, stating clearly the assumptions.
10. Explain the technique of estimation of two missing observations in a LSD.
11. Obtain relative efficiency of RBD in comparison to CRD.
12. Outline the analysis of ANCOVA for RBD with one concomitant variable.
13. Define BIBD. Construct a BIBD with the following parameters:-
    v = b = 4, $\gamma = \kappa = 3$ and $\lambda = 2$.
14. In BIBD, show that (i) $bk = vr$. (ii) $\lambda(v-1) = r(t-1)$.
15. Explain the concept of confounding in factorial experiments?
16. Explain the use of response surface designs.

Part C

(*Answer any* three *questions. Weightage* 5 *for each question.*)

17. Prove a necessary and sufficient condition of estimability. If $e'\ \beta$ and $m'\ \beta$ are estimable, find $V(e'\ \hat{\beta})$ and covariance $(e'\ \hat{\beta},\ m'\ \hat{\beta})$, where $\hat{\beta}$ is the least square estimate of β.

18. Describe the analysis of a completely Randomized Design with k observations percell.

19. In the case of two associate class PBIBD, define the parameters and develop the intra-block analysis using a suitable model.

20. Explain Yates procedure for obtaining the various effect total in a 2^3 factorial experiment.

21. Construct a 2^5 design in blocks of 8 plots confounding ABC, ADE and BCDE. Gie the analysis of such a design with r replications.

22. Develop the analysis of covariance for randomized block design with one concomitant variable, stating clearly the assumptions.