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M.Sc DEGREE (CSS) SPECIAL REAPPEARANCE EXAMINATION, APRIL 2025

Third Semester

CORE - ST500302 - DESIGN AND ANALYSIS OF EXPERIMENTS

M.Sc STATISTICS,M.Sc STATISTICS WITH DATA SCIENCE

2019 ADMISSION ONWARDS

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Time: 3 Hours   Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Explain Gauss Markov model

2. Explain the concepts of (i) linear model (ii) BLUE.

3. Explain fixed effect and random effect models with examples

4. Give the lay out of three way classified design.

5. Discuss how the efficiency of an experiment can be increased by increased replication and local control.

6. Obtain the expression for main effects of a 2^2 factorial experiment.

7. Explain the meaning of analysis of variance. State the basic assumptions in ANOVA.

8. Distinguish between ANOVA and ANOCOVA.

9. Define PBIBD.

10. Derive the set of orthogonal contrasts for main effects and interaction in a 2^3 factorial experiment.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. State and prove a necessary and sufficient condition for the estimability of a linear parametric function.

12. Derive the least square estimates of parameters involved in CRD.

13. Define LSD. Give an example.

14. Derive the expression to estimate one observation missing in LSD with k treatments and r replications.

15. Explain Graeco Latin square design with an example. Derive the estimates of the parameters involved in its model.

16. What do you mean by balanced incomplete block design. Explain the statistical model for a BIBD.

17. Explain Yates' procedure for obtaining various effect totals in a 2^n factorial experiment.

18. Explain the concept of split plot design. Give Applications of split plot design.

<div align="right">(6×2=12 weightage)</div>

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Give the complete statistical analysis of two way classified data.

20. (a) What do you understand by missing plot in a design of experiment. (b) Explain how missing plot technique can be used to estimate the missing yield of two plots in the case of LSD. Also write down the analysis of variance table.

21. Define BIBD and develop intra block analysis of BIBD.

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

<div align="right">(2×5=10 weightage)</div>