Registration Number:

Date & Session:

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU -27

M.Sc. STATISTICS – IV SEMESTER

SEMESTER EXAMINATION: APRIL 2023

(Examination conducted in May 2023)

ST0220: Design and Analysis of Experiments

(For current batch students of only)

Time: 2 ½ Hours **Max Marks: 70**

This question paper contains 2_printed pages and two parts

Part A

Answer any 06 questions **(3*6=18)**

1. Define connectedness and Variance balanced of a block design.
2. Estimate missing observation in RBD.
3. Examine whether an RBD is variance balanced or not.
4. Obtain the efficiency factor of a BIBD.
5. Define Youden square design.
6. Distinguish between ANOVA and ANCOVA.
7. What are main effects and interaction effects in a factorial experiment?
8. Discuss about confounding and its importance in factorial experiments.

Part B

Answer any 04 questions **(13*4= 52)**

9. Explain intra block analysis of general block design along with testing of hypothesis.
10. a) Describe balanced incomplete block design (BIBD). Show that in the usual notations, $b \geq v$.

    b) Outline the Intra-block analysis of a BIBD. (4+9)

11. a) Write down the linear model for a PXP LSD. Obtain its normal equations. Also, setup the ANOVA table.

    b) Explain Duncan's multiple comparison test. (8+5)

12. Describe one way analysis of variance with a single covariate for CRD and RBD.

13. a) Explain main effect and interactions in a 2^3 factorial experiment and write the appropriate treatment contrasts.

    b) Define linear and quadratic effects in a 3^2 factorial experiment. Outline the Yates technique of computing sum of squares in a 3^2 factorial experiment (5+8)

14. a) Describe partial confounding. Explain partial confounding with reference to a 2^n factorial experiment with an example.

b) Write a note on fractional factorial experiment. (9+4)

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