SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
M.Sc. Biostatistics - END SEMESTER EXAMINATIONS APRIL - 2024
SEMESTER - II
21PBSCT2006 - Design of Experiments

Total Duration : 2 Hrs. 30 Mins.   Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. What is a two-factor ANOVA? Describe the scenarios in which it is used with unequal and equal replication.

2. Differentiate between fixed, random, and mixed effects models in the context of ANOVA.

3. Describe the concept of randomized block designs. How do they differ from completely randomized designs (CRD)?

4. What is a Latin square design? How does it help in controlling for extraneous variables in an experiment?

5. Derive the equality conditions of the parameters of BIBD.

6. Describe the concept of total confounding in a 2^k design in 2^p blocks, where p = 1, 2. How does total confounding affect the interpretation of experimental results.

7. Explain the characteristics of three-level factorial designs, focusing on contrasts for linear and quadratic effects.

8. What is the purpose of single factor analysis of variance (ANOVA)? How does it compare to other statistical tests such as t-tests?

Section C

I - Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. What are multiple comparison tests, and why are they important in ANOVA? Discuss the differences between Tukey, Newman-Keul, and Scheffe tests.

10. Discuss the role of ANOCOVA (Analysis of Covariance) in completely randomized designs (CRD) and randomized block designs (RBD).

11. Explain the process of analyzing a single replicate and multiple replicates of a 2^k full factorial design using ANOVA

12. Explain the process of layout preparation and analysis of split-plot design.

13. Describe the advantages and limitations of fractional factorial designs in comparison to full factorial designs.

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