PG EVEN SEMESTER EXAMINATION, 2024

STATISTICS

4th Semester

Course No. : STS - 651

(Design & Analysis of Experiments)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

(Answer five questions taking one from each unit)

Unit - I

1. (a) What do you mean by analysis of variance (AOV)? State clearly the fundamental assumptions involved and the different types of models associated with the AOV technique. 2+3+5=10

   (b) What do you mean by analysis of covariance? Also explain its uses. 2+2=4

2. (a) Discuss with the help of analysis of variance table, the tests in the case of a two-way classified data with more than one observations per cell.7

   (b) Give the details of analysis of cavariances (AOCOV) under two-way classified data. 7

Unit - II

3. (a) Discuss in detail the application of analysis of variance and regression analysis. 7

   (b) Discuss briefly the technique of AOV for testing the linear multiple regression model. 7

4. (a) Use the technique of AOV for testing the linearity of regression model. 7

   (b) Discuss briefly the technique of AOV for testing the homogeneity of a number of regression coefficients. 7

Unit - III

5. What do you mean by Latin Square Design (LSD)? What is the importance of this design? Also discuss its merits and demerits. Give the complete layout and analysis of this design. $1^1/_2+1^1/_2+4+7=14$

6. (a) What is a completely randomized design? Give the complete statistical analysis of CRD. 3+7=10

   (b) Derive the expression to measure the efficiency of RBD over CRD. 4

Unit - IV

7. What is a factorial experiment? Explain clearly the advantages and disadvantages of factorial experiment. Give in details the analysis of a 2^3-factorial experiment conducted in RBD with r-replication. 2+4+8=14

8. (a) Give an outline of analysis of a 3^2-factorial experiment conducted in RBD. 8

   (b) Discuss in detail about the types of confounding. 6

Unit - V

9. Define BIBD and proof its design assumptions. 4+10=14

10. (a) What do you mean by resolvable BIBD. Prove that if in a BIBD (t, b, r, k, λ), b is divided by r then prove that 3+6=9

$$b \geq t + r - 1$$

   (b) What do you mean by incomplete block design? What are its types and its difference? 5

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