

B.Sc. (Honours) Examination, 2019

Semester - VI

Statistics

Course : BSC-63 (BSE-1) (Old)

(Design of Experiments)

Time : 3 Hours

Full Marks : 40

Questions are of value as indicated in the margin

Answer **any five** questions from the following

1. What do understand the terms local control and replication in designing an experiment? How local control is achieved through the use of analysis of covariance and confounding in factorial experiments? What is the role of randomization in an experiment? 3+3+2
 2. Briefly discuss the principles of design of experiments used in Randomized Block Design (RBD). Obtain the critical difference for the difference of two treatment effects at a level of significance α for RBD. 3+5
 3. How will you estimate the yield of a missing plot in LSD? Discuss in detail how you will carry out the analysis of LSD after estimating the yield of missing plot. 3+5
 4. Illustrate the use of the technique of analysis of covariance in reducing error in case of Latin Square Design (LSD). 8
 5. Define the terms main effects and interaction effects in relation to a 2^3 experiment and show that they are mutually orthogonal. How do you obtain the sum of squares due to main effects or interaction effects in this experiment? 3+3+2
 6. Differentiate between total and partial confounding in factorial experiments. Give the layout (before randomization) of $(2^3, 2)$ in 4 replicates where each main effect is unconfounded but each interaction is partially confounded. Also provide the amount of information on each factorial effect. 2+4+2
 7. What is a split-plot experiment? Discuss the layout and analysis of a split-plot experiment in RBD. How will you estimate the standard error of the difference between two sub-plot treatment means at the different levels of the whole-plot treatment? 2+4+2
 8. Write short note on any two of the following: 4+4
 - (i) Size and shape of plots and blocks in design of experiments.
 - (ii) Series of experiments.
 - (iii) Efficiency of LSD compared to RBD.
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