B. Sc. (Honours) Semester-VI Examination 2017
Statistics (Honours)
Course: BSC-63
(DOE, BSE-1)

Time : Three Hours **Full Marks : 40**

Questions are of value as indicated in the margin

Answer **any four** questions

1. With reference to a designed experiment, discuss the role of randomization and local control. How local control is achieved through the use of analysis of covariance and confounding in factorial experiment? Why replication is needed in designing an experiment? 4+4+2=10

2. Define an observational contrast. When two such contrasts are said to be non-orthogonal? With reference to a randomized block design, distinguish between block and treatment contrasts. Show that the estimates of block contrasts and treatment contrasts are orthogonal to each other. Further show that the estimates of two treatment effects are not orthogonal to each other. 1+2+2+3+2=10

3. Consider an experiment that was designed and performed as an randomized block design but analyzed as a completely randomized design. If the blocks are effective would the standard errors of estimates from the CRD analysis be too large or too small? Give a detailed justification of your answer. 1+9=10

4. Discuss the difference between a split-plot design and a simple two factor experiment. Discuss in detail the analysis of a split-plot design when the whole-plot factors are in RRD. 2+8=10

5. Distinguish between ANOVA and ANOCOVA. Discuss in detail analysis of covariance of an LSD with one concomitant variable. 2+8=10

6. With reference to a 2^2 experiment, discuss in detail the Yates's algorithm for finding the sum of squares of the factorial effects. Show that for a $(2^n, 2^2)$ factorial experiment, if the factorial effects X and Y are confounded then their generalized interaction effect will automatically gets confounded in the same replicate. 4+6=10

7. Discuss in detail the confounding of a factorial experiment. Distinguish between total and partial confounding. Define balanced confounding. Construct a balanced $(2^5, 2^2)$ experiment achieving balance over three and four factor interaction effects in minimum number of replicates. 2+2+1+5=10
