PG Odd Semester (CBCS) Exam., December—2016

STATISTICS

(3rd Semester)

Course No. : STS–301 (C)

(Design and Analysis of Experiments)

Full Marks : 75
Pass Marks : 30

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) Write down the principle of covariance technique. 5

2. *(a)* Give the complete analysis of AOV for one-way classified data. 5

(b) Give the details of analysis of covariance (AOCOV) under two-way classification of the data. 10

UNIT—II

3. *(a)* What is a treatment contrast? When are two such contrasts said to be orthogonal? Discuss briefly the application of AOV and regression analysis. 2+2+6=10

(b) Briefly discuss the test statistic for Kruskal-Wallis test. 5

4. *(a)* Describe the Friedman's test for two-way AOV by ranks. 8

(b) Following are the marks given by 6 judges to 5 candidates :

Judges	*Candidates*				
	A	*B*	*C*	*D*	*E*
1	20	40	55	11	30
2	13	51	29	20	41
3	33	21	10	43	49
4	23	43	29	9	57
5	30	51	9	20	41
6	23	32	44	10	56

Using Friedman's analysis of variance by ranks, check if the judges have a special liking towards a particular candidate.

(Given that table value of ^{2} for 4 degrees of freedom at 5% level of significance is 9·49) 7

UNIT—III

5. *(a)* What is a completely randomized design? Give the statistical analysis of randomized block design (RBD) for the observation per experimental unit. 3+7=10

(b) What are the advantages and disadvantages of Latin square design (LSD)? 5

6. *(a)* Obtain the formula for estimating a single-missing value of a m m LSD. 5

(b) What do you men by efficiency of a design? Derive the expression to measure the efficiency of LSD over CRD. Also write down the advantages and disadvantages of Graeco-Latin square design. 3+5+2=10

UNIT—IV

7. *(a)* Explain the terms 'complete confounding' and 'partial confounding'. What are the advantages and disadvantages of confounding? 5+3=8

(b) Give in detail the analysis of a 2^3-factorial experiment conducted in randomized blocks. 7

8. *(a)* Write a note on factorial experiment (FE). 5

(b) What is fractional factorial design? Explain one-half fraction of the 2^k-design. Define resolution III designs. 2+7+1=10

UNIT—V

9. Give the complete analysis of interblock analysis and recovery of interblock information in balanced incomplete block design (BIBD). 15

10. *(a)* What is a split-plot design? Give the layout and complete analysis of split-plot design. Also discuss the advantages of this design. 1½+7+1½=10

(b) Write a short note on strip-plot design. 5

★ ★ ★