

B.Sc. Semester –V
Statistics : Paper - S -504
(Design of Experiment)

PAPER CODE: 4333

Time : $2\frac{1}{2}$ Hours

Total Marks: 70

- Instructions:- 1) There are five compulsory questions in this Q. Paper
2) All Question carry equal marks.
3) Statistical Table will be provided on request.
4) Use of Scientific calculator is allowed.

- Q-1 a) What is ANOVA. State the basic assumptions in the analysis of variance. 6
b) Distinguish between fixed effect model and random effect model in the analysis of variance. 8

OR

- Q-1 a) Explain the following terms: 6
(i) randomization (ii) replication (iii) local control
b) Describe the fixed effect model for ANOVA testing in Two way classification. Stating clearly (i)the assumptions (ii)the hypothesis to be tested (iii)the test statistics to be used and (iv) ANOVA Table 8

- Q-2 a) What is the difference between CRD and RBD. 8
b) Give the complete analysis of completely randomized design. State its advantages and disadvantages 6

OR

- Q-2 a) Give layout plan of RBD. with $v \times b$ observations. If the yield of one plot is missing in RBD . Explain the missing plot technique for estimating the missing yield. Give analysis of such design. 8
b) Describe Missing plot technique in the design of experiment. State its advantages, missing plot technique is not applicable in case of CRD why? 6

- Q-3 a) Outline the various steps in carrying out the ANOVA of Latin Square Design. State its Merits and demerits. 8
b) A farmer applies three types of fertilizers on 4 separate plots. The figures on yield per acre are tabulated below. 6

Fertilizers	Yields(tonnes)			
	A	B	C	D
Nitrogen	6	4	8	6
Potash	7	6	6	9
Phosphate	8	5	10	9

Find out if the plot are materially different in fertility, as also, if three fertilizers make any material difference in yields.

OR

- Q-3 a) Obtain the formula for estimating one missing yield in a $k \times k$ LSD. Give analysis of such design. 10
- b) Find out efficiency of RBD compare to CRD from the following result. 4

Source	D.F.	S.S.	M.S.S.
Treatments	4	83.84	20.96
Blocks	4	49.84	12.46
Error	16	86.56	5.41
Total	24	---	---

OR

- Q-4 a) What is factorial experiment? State its advantages. 5
- b) Explain main effects and interaction in 2^3 factorial Experiments. Also give its analysis. 9

OR

- Q-4 a) Explain Yate's Method for 2^2 factorial experiments. 8
- b) Explain treatment contrast and orthogonal contrasts giving illustration of each. 6
- Q-5 a) Explain what is meant by main effects and interactions in factorial experiment. A complete 2^2 experiment is replicated r times. Describe the procedure for testing the presence of main effects and interactions. 8
- b) What is Confounding? Explain total confounding and partial Confounding giving illustration of each. 6

OR

- Q-5 a) Explain the Yate's method for computing various factorial effect totals in 2^3 factorial experiments. 8
- b) Identify the confounded interactions in each case for the following 2^3 Factorial Experiment. 6

Replicate I				Replicate II				Replicate III			
(1)	ac	ab	bc	(1)	c	ab	abc	(1)	a	bc	abc
abc	a	b	c	a	b	ac	bc	b	c	ab	ac