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QP CODE: 24000589



Reg No	:	
Name	:	

## B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE EXAMINATIONS, MARCH 2024

## Sixth Semester

B.Sc Statistics Model I

## **CORE COURSE - ST6CRT11 - DESIGN AND ANALYSIS OF EXPERIMENTS**

2017 Admission Onwards

CB8C8E6F

Time: 3 Hours

Max. Marks : 80

Part A

Answer any **ten** questions.

- Each question carries **2** marks.
- 1. What do you mean by a linear model?
- 2. How do you define a linear hypothesis?
- 3. Write the format of ANOVA table for two way classified data.
- 4. What do you understand by 'analysis of covariance'?
- 5. Describe the factors affecting the efficiency of a design.
- 6. Give any two applications of CRD.
- 7. How do you estimate two missing observations in RBD?
- 8. Give an example of a layout of LSD.
- 9. What do you mean by column efficiency of LSD over RBD?
- 10. What are the advantages of factorial experiment over simple experiment?
- 11. What is meant by interaction effects?
- 12. Obtain the expression for the main effect of the factor A in a  $2^2$  design having factors A and B.

(10×2=20)

### Part B

Answer any **six** questions.

Each question carries 5 marks.

- 13. State and prove the necessary and sufficient condition for the estimability of a linear parametric function.
- 14. Describe the procedure of one- way classified ANOVA.
- 15. Explain briefly about the fundamental principles of design of experiments.





- 16. Describe the analysis of variance table for a completely randomised design.
- 17. Discuss the statistical analysis of RBD with one observation per cell.
- 18. What are the advantages and disadvantages of RBD?
- 19. How would you obtain the relative efficiency of RBD over CRD? Explain.
- 20. Describe Yates' method of computing factorial effect totals.
- 21. A  $2^4$  experiment with factors A,B,C and D is conducted according to an RBD layout. Write down the analysis of variance explaining the simple effects.

(6×5=30)

#### Part C

Answer any **two** questions.

#### Each question carries 15 marks.

22. The following table gives the layout and the results of a 2<sup>3</sup> factorial design laid out in 4 replicates. The purpose of the experiment is to determine the effect of different kinds of fertilizers: Nitrogen (N); Potash (K) and Phosphate (P) on potato crop yield.

Block I		Block II						
nk	kp	р	np		kp	р	k	nk
291	391	312	373		407	324	272	306
1	k	п	nkp		п	nkp	np	1
101	265	106	450		89	449	338	106
Block III			Block IV					
n	1							
P	1	np	kp		np	nk	п	р
<i>P</i> <i>323</i>	1 87	пр 324	кр 423		пр 361	nk 272	n 103	р 324
223 nk	1 87 k	пр 324 п	kp 423 nkp		np 361 k	nk 272 1	n 103 nkp	р 324 kp

Analyze the data and give your conclusion.

23. Fill in the blanks in the following Analysis of variance table of the L.S.D. Also set up the analysis of variance.

Source of Variation	d.f	S.S	M.S.S	F
Rows		72		2
Columns			36	
Treatments		180		
Error	6		12	
Total				

- 24. How do you estimate a missing observation in LSD? Derive the formula for estimating a missing observation.
- 25. Explain  $2^3$  factorial experiment and obtain its ANOVA table.

