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(20623) Roll No. .....

M. Sc.-IV Sem.

14160

M. Sc. Examination, June 2023

STATISTICS

Advanced Experimental Design

(H-4036)

Time : Three Hours] *[Maximum Marks : 50*

Note : Attempt questions from all Sections as per instructions.

Section-A

(Very Short Answer Type Questions)

Attempt all the *five* questions. Each question carries 2 marks. Very short answer is required.

2×5=10

1. Write the addition and multiplication tables of $GF(2^3)$.

2. Construct orthogonal Latin squares of order 5.

3. Describe a BIBD (v, b, r, k, l) with detailed meanings or its parameters. Write down the parametric relations as well.

4. Write a note on the method of construction of BIB designs with parameters :

$v, k, b = {}^{v}c_{k}, r = {}^{v-1}c_{k-1}, \lambda = {}^{v-2}c_{k-1}$.

5. One of the block of a 2^4 experiment in factors A, B, C and D are given below :

$a, bc, abd, cd.$

Identify the confounded interaction(s).

Section-B

(Short Answer Type Questions)

Attempt any *two* questions out of the following three questions. Each question carries 5 marks. Short answer is required. 5×2=10

6. Define triangular PBIB (2) designs. Give its analysis using C-matrix.

7. Define complete confounding and partial confounding. Write down the elements of keyblock of 2^6 factorial experiment in block of size 2^3, such that no any main effects and two factor interactions are confounded. Give the list of interactions confound as well.

8. (a) Define symmetrical BIB designs with parameters ($v = b = s^2 + s + 1,\ r = k = s,\ \lambda = 1$) and their methods of construction.

(b) Construct a BIBD ($v = 9, b = 12, r = 4, k = 3, \lambda = 1$) using any method.

Section-C

(Detailed Answer Type Questions)

Attempt any *three* questions out of the following five questions. Each question carries 10 marks. Answer is required in detail. 10×3=30

9. Define rectangular design. Give its analysis using C-matrix method.

10. Describe the procedure of splitting the treatment *SS* in 4×2 factorial experiment into its components each with 1 d.f.

11. What are rotable central composite designs ? Give the analysis with variance of estimated response.

12. (a) Give nay two methods of construction of group divisible PBIB(2) design.

(b) Construct a triangular PBIB(2) design with parameters :

$v = 10, b = 10, r = 3, k = 3, \lambda_1 = 1, \lambda_2 = 0.$

13. Describe projective geometry PG(n, s) and Euclidean Geometry EG(n, s)