Roll No.							

25-ST-41

M.Sc. IV SEMESTER [MAIN/ATKT] EXAMINATION
MAY - JUNE 2025

STATISTICS

Paper - I

[Design of Experiments]

[Max. Marks : 75] *[Time : 3:00 Hrs.]* *[Min. Marks : 26]*

Note : Candidate should write his/her Roll Number at the prescribed space on the question paper.
Student should not write anything on question paper.
Attempt all five questions. Each question carries an internal choice.
Each question carries **15 marks.**

Q. 1 What is the Latin Square Design ? Describe its layout and break up the sum of squares for it. What are different hypothesis that are tested into analysis ? **(15 marks)**

OR

What do you understand by "Missing Plot" in design of experiment. Estimate missing value in case of RBD. **(15 marks)**

Q. 2 Derive the analysis of covariance for two way layout (with one concomitant variable). **(15 marks)**

OR

Elucidate the structure of a split plot design. **(15 marks)**

Q. 3 a) What do you understand by Orthogonality in block design ? **(5 marks)**

b) Explain the analysis of general block design. **(10 marks)**

OR

State and prove property of connectedness. **(15 marks)**

Q. 4 Prove that, In BIBD $b \geq v$ (where the notations have their usual meaning. **(15 marks)**

OR

a) Define PBIBD with m associate classes, defining an association scheme. **(5 marks)**

b) Define a BIBD and prove that with usual notations that for the existence of a BIBD the following equations must always be true -
$h\,k = v\,.\,r$ and $r\,(k-1) = \lambda\,(v-1)$ **(10 marks)**

P.T.O.

Q. 5 Give the statistical analysis of 2^3 factorial experiment. Also explain sign table for the same. **(15 marks)**

OR

a) What do you understand by 2^3 factorial experiment ? Give ANOVA table for the same. **(05 marks)**

b) Define and explain partial confounding in 2^3-Factorial experiments. **(10 marks)**