Roll No.							

24-ST-22

M.Sc. II SEMESTER [MAIN/ATKT] EXAMINATION
JUNE - JULY 2024

STATISTICS
Paper - II
[Distribution Theory - II]

[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 five questions. Each question carries an internal choice.
Each question carries **15 marks.**

Q. 1 a) Explain the concept of marginal and conditional probability distribution.

b) If

$$f(x, y) = \begin{cases} 21x^2 y^3 & , \quad 0 < x < y < 1 \\ 0 & , \quad \text{otherwise} \end{cases}$$

Find - i) Marginal distribution of X and Y.

ii) Find conditional distribution of X given Y = y.

OR

Joint distribution of X and Y are given by -

$f(x, y) = 4\, x\, y\, e^{-(x^2 + y^2)}; \quad x \geq 0 \;, \quad y \geq 0$

Test whether X and Y are independent.

Q. 2 Define bivariate normal distribution. Find its moment generating function.

OR

Explain the meaning and significance of correlation. State and extreme values of the coefficient of correlation r and interpret them.

Q. 3 Obtain the sampling distribution of sample mean from a univariate normal distribution.

OR

a) Give a test of population variance σ^2 based on chi-square.

b) Give Chi-square test for independence of two attributes.

P.T.O.

Q. 4 Derive non central χ^2 distribution ? How does it differ from central χ^2 distribution

OR

Explain non - central F distribution. Obtain its m.g.f.

Q. 5 Show that (X,Y) possesses a bivariate normal distribution if and only if every linear combination of X and Y is a normal variate.

OR

Obtain the distribution of sample correlation coefficient when population correlation coefficient is zero.

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