



NP – 231

20
III Semester B.Sc. Examination, January/February 2025

(NEP) (F + R)

STATISTICS (Paper – III)

ST – 301 : Calculus and Probability Distributions

Time : 2½ Hours

Max. Marks : 60

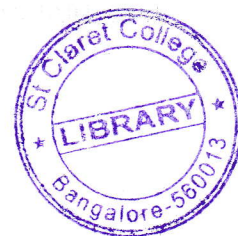
- Instructions :** i) Scientific calculator are **permitted**.
ii) Statistical tables and graph sheets are provided on request.

PART – A

Answer **any four** questions (2 marks **each**).

(2×4=8)

1. What do you mean by continuity of a function ?
2. Define joint distribution.
3. Define hypergeometric distribution.
4. Write down the definition of multinomial distribution.
5. What do you mean by standard error ?
6. Define simulation.



PART – B

Answer **any four** questions (5 marks **each**).

(5×4=20)

7. State and prove Mean Value Theorem.
8. Write a note on marginal distribution and conditional distribution of a random variables.
9. Prove that $V(aX + bY) = a^2 V(X) + b^2 V(Y) + 2ab \text{Cov}(X, Y)$.
10. Derive mean and variance of a rectangular distribution.
11. Obtain the mean of Beta distribution of first kind.
12. State and prove additive property of a Chi-square distribution.

P.T.O.



PART – C

Answer **any four** questions (8 marks **each**).

(8×4=32)

13. a) Show that $f(x) = x^r$ is continuous on 'R'.

b) Show that the function $f(x) = \frac{1}{x}$ is continuous at 1.

(4+4)

14. State and prove multiplication theorem on expectation.

15. State and prove weak law of large numbers.

16. Obtain mean, variance and mgf of Geometric distribution.

17. Define Gamma distribution and derive the mean and variance of it.

18. Write the procedure for generating a random observations from exponential distribution.