



Date:

Registration number:

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27
B.Sc. STATISTICS – II SEMESTER
SEMESTER EXAMINATION: APRIL 2022 (Supplementary)
(Examination conducted in July 2022)

ST 218: THEORETICAL PROBABILITY DISTRIBUTION

Time: 2 ½ Hours

Max: 70 Marks

This question paper contains ONE printed page and THREE parts

Note: Scientific calculators are allowed.

PART A

I Answer any FIVE from the following 3 x 5 = 15

1. Give PMF of Geometric distribution with usual notations.
2. Distinguish between Discrete Probability Distribution and Continuous Probability Distribution.
3. Derive the recurrence relation for Binomial Probabilities
4. State the weak law of large numbers
5. State Central limit theorem
6. Define F-statistic under normality assumptions
7. State the inter relations between Binomial and Poisson Distribution

PART B

II Answer any FIVE from the following 5 x 5 = 25

8. A) What are Bernoulli trials? Under what conditions the binomial is obtained?
B) Give the Probability mass Function of Poisson Distribution. Derive MGF of Poisson Distribution. (3+4)
9. Which distribution has Lack of memory property among Discrete Distribution? State and Prove Lack of memory property? (7)
10. A) Define Rectangular Distribution with its properties.
B) Derive the MGF of the Gamma Distribution. (3+4)
11. A) Distinguish between Probability Sampling and Non-Probability Sampling
B) Show that a linear combination of independent normal variates is also a normal variate (2+5)
12. A) Write a short note on Gamma Distribution
B) Explaining any one method of drawing a random sampling (3+4)
13. A) Define (i) Statistic (ii) Parameter (iii) Sampling Distribution (iv) Standard Error
B) State Chebychev's Inequality (4+3)
14. A) Give the probability mass function of negative binomial distribution
B) Derive the distribution of sampling mean (2+5)

PART C

III Answer any TWO from the following 10 x 2 = 20

15. A) The mean and Variance of a Binomial distribution are 6 and 3. Find $P(X \geq 2)$
B) Give the PMF of Hypergeometric Distribution. Derive the mean of Hypergeometric Distribution (4+6)
16. A) Define Beta Distribution of first kind.
B) Find the r th moment about origin of beta distribution of first kind.
C) Define Survival function and Hazard function (2+5+3)
17. A) If X_1, X_2, \dots, X_n be a random sample from $N(\mu, \sigma^2)$, then give mean and variance of \bar{X} .
B) State and prove additive property of exponential Distribution
C) Define 't' statistic and about normality assumptions for the same. (2+6+2)
