**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27**

**Register No:**

**Date:**

B.Sc. StatisTICS-II Semester

SEMESTER EXAMINATION: APRIL 2019

**ST 218: Theoretical Probability Distributions**

**Time: 2½ hrs Max Marks 70**

This Question Paper Contains **TWO** Printed Pages and **THREE** Parts

**PART-A**

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

* 1. Give any three characteristics of Negative Binomial Distribution.
	2. Distinguish between Discrete Probability Distribution and Continuous Probability Distribution.
	3. Derive the recurrence relation for Binomial Probabilities.
	4. State 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 7 = 35**

* 1. A) What are Bernoulli trials? Under what conditions the Binomial is obtained?

B) Give the Probability mass function of Poisson Distribution and derive Moment generating function (MGF)of it. (3+4)

* 1. Which distribution has Lack of memory property among Discrete Distributions? State and Prove Lack of memory property. (7)
	2. A) Define Rectangular Distribution with its properties.

B) Derive the Moment generating function(MGF) of the Gamma Distribution. (3+4)

* 1. A) Distinguish between Probability Sampling and Non-Probability Sampling method.

B) Show that a linear combination of independent Normal variates is also a Normal variate. (2+5)

* 1. A) Write a short note on Exponential Distribution

B) Explain any one method of drawing a random sampling (3+4)

* 1. A) Define (i) Statistic (ii) Parameter (iii) Sampling Distribution (iv) Standard Error

B) State Chebychev’s Inequality. (4+3)

* 1. A) Distinguish between Complete enumeration and Sample Survey

B) In a particular route, at office time, buses are running at an interval of 25 minutes. If Mr. X comes at the stoppage at random, what is the probability that he has to wait for 10 minutes or more for next bus. (4+3)

**PART – C**

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

* 1. A) The mean and variance of a Binomial distribution are 6 and 3. Find P( X ≥ 2)

B) Give the PMF of Hypergeometric Distribution and derive the mean of it. (4+6)

* 1. A) Define Beta Distribution of second Kind.

B) Find the rth moment about origin of Beta distribution of first kind.

C) Define Survival function and Hazard function. (2+5+3)

* 1. A) If X1, X2, …..,Xn be a random sample from N(µ,σ2), then give mean and variance of $\overbar{X}.$

B) State and prove additive property of Gamma Distribution.

C) Define ‘t’ statistic under normality assumptions. (2+6+2)