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Register Number:

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

B.Sc. STATISTICS - II SEMESTER

SEMESTER EXAMINATION – APRIL 2019

**ST 218: THEORETICAL PROBABILITY DISTRIBUTIONS**

**Time: 2½ Hours Max: 70 Marks**

This question paper has **TWO** printed pages and **THREE** parts.

**PART – A**

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

1. Choose correct answer for the following.

A) The variance of Binomial distribution is always ……….

i) Less than mean ii) Equal to mean

iii) Greater than mean iv) None of these

B) Hypergeometric distribution has ….. parameters

i) 1 ii) 2 iii) 3 iv) none

C) If X: No. of attempt before clearing ISI entrance exam is an example for

i) Neg-Binomial ii)Geometric

iii)Binomial iv)Exponential

1. Briefly explain additive property of Binomial distribution.
2. Define a random variable and explain the different types of random variables with examples.
3. Define Exponential random variable and give two examples for it.
4. Define Hazard function.
5. Mention any three properties of continuous uniform distribution.
6. Obtain the mean of Poisson distribution.

**PART – B**

**II Answer any FIVE of the following: 5 x 7 = 35**

1. A) Derive the moment generating function(MGF) Bernoulli distribution (4)

B) Show that sum of two independent Poisson variate is also Poisson variate (3)

1. A) State and explain lack of memory property of Geometric Distribution (5)

B) Mention the mean and variance of Hypergeometric distribution (2)

1. A) Give any two properties of Gamma variate. (2)

B) Mention three applications of Chi-square test. (3)

C) Name any two life time distributions used in reliability (2)

1. A) Find the mean and variance of Exponential Distribution when X~ Exp(1/ Ɵ) (5)

B) Define Cauchy distribution (2)

1. A) Differentiate between Probability and Non-probability sampling. (3)

B) Explain the method of drawing random samples from Lottery system (4)

1. A) Derive the sampling distribution of sample variance (4)

B) State t and F statistic under normality assumption. (3)

1. A) State Weak law of large numbers(WLLN) (2)

B) Define Chebyshev’s inequality and mention application of it. (2)

C) State Linder-berg Levy central limit theorem (3)

**PART – C**

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

1. A) What are the relationship between Bernoulli, Binomial and Poisson distribution?(3)

B) Derive the recurrence relationship for moments for Neg-Binomial Distribution. (7)

1. A) Define Normal distribution and mention any three properties of it. (6)

B) Define of Gamma distribution and obtain mean of it (4)

1. A) If X1,X2…..Xn be a random sample from N(µ,σ2), then derive the distribution of

sample variance. (7)

B) In a survey of a company, mean salary of employees is 29,321 dollars with standard deviation of 2,120 dollars. Find the proportion of employees with mean salary less than 29,000 dollars? At n=100 (Only explain the steps) (3)