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DATE: 19-04-2019

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

B.Sc. STATISTICS - II SEMESTER

SEMESTER EXAMINATION – APRIL 2018

**ST 215: Theoretical Probability Distributions**

**(FOR SUPPLEMENTARY CANDIDATES ONLY)**

Do not write the register number on the question paper

Please attach the question paper along with the answer script

**Time: 2 ½ 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. Define a random variable and explain the different types of random variables with examples.
2. Define geometric random variable and explain how it relates to negative binomial distribution?
3. Define Population and sample
4. Suppose that the moment generating function (m.g.f) of a random variable X is of the form Mx(t)= (0.3et + 0.7)6 . What is the m.g.f of the random variable Y=5X – 2?
5. Write down the density function for Normal distribution with mean zero and variance one.
6. Write down the probablity density function for continuous Uniform Distribution on support – 4 to 4
7. Mention any three advantages of simulation.

**PART – B**

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

1. A) Find the mean for discrete Uniform Distribution. (3)

B) Derive an expression for variance of Binomial Distribution. (4)

1. A) Derive mean of geometric random variable (3)

B) Define Poisson random variable and give two examples for it. (4)

1. A) Write down any four properties of Normal distribution and prove any one of it. (4)

B) Find the mean of Exponential Distribution with mean Ɵ. (3)

ST-215-A-18

1. A) State and prove memory less property of Geometric Distribution. (5)

B) Explain Statistic and Parameter (2)

1. A) What do you mean by sampling distribution? And explain random sample with an example. (4)

B) What is standard error? And state its uses. (3)

1. A) If X1,X2…..Xn be a random sample from N(µ,σ2 ), then show that (3)

$\sum\_{i=1}^{n}(\frac{xi-µ}{σ})$2$\~χ$2(n)

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

sample mean ($\overbar{x}$) (4)

1. A) Explain Distribution function method of simulating random observations from a specified distribution. (4)
2. Monte Carlo method of simulation. (3)

**PART – C**

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

1. A) Give recurrence relationship for probabilities for Binomial Distribution (4)

 B) Derive mean of Poisson distribution (4)

C) Define Hyper Geometric Distribution (2)

1. A) Define ***‘F’*** statistic under normality assumptions. (3)

B) Define Beta distribution of 1st kind (2)

C) Define of chi-square variate and obtain the mean of it (5)

1. A) State and prove additive property of exponential distribution. (5)

 B) Define t-distribution and give atleast four properties of t-distribution. (5)

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