PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2017
(Third Semester)

Branch- **STATISTICS**

PROBABILITY DISTRIBUTIONS

Time : Three Hours Maximum : 75 Marks

SECTION-A (20 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10x2 = 20)

1 Define the weak law of large numbers.
2 State cenral limit theorem.
3 What is discrete random variable?
4 Define independence of two random variables.
5 Define Negative binomial distribution.
6 Define Geometric distribution.
7 State any two properties of Gamma distribution.
8 Give any two properties of Normal distribution.
9 What are the assumptions of student's 'f test?
10 Define F distribution.

SECTION - B (25 Marks)
Answer **ALL** Questions
. **ALL** Questions Carry **EQUAL** Marks (5x5 = 25)

11 a Prove that if the distribution function of a random variable X is symmetrical about zero.

OR '

b State and prove Bernoulli's law of large numbers.

12a If the joint pdf of (X,Y) is given by f(x,y) = 2-x-y in 0 < x < y < 1, find E(X)

OR

b The joint probability density function of (x, y) is given by f(x, v) = e~^x+y), x >0, y >0. Are x & y are independent?

13 a Obtain the MGF of Binomial distribution.

OR

b Obtain the MGF of Poisson distribution.

14 a State and prove the memory less property of Exponential distribution.

OR

b Find the MGF of Rectangular distribution.

15 a Describe the derivation of student's t-distribution,

OR

b Derive the characteristic function of x~ distribution.

SECTION - C (30 Marks)
Answer any **THREE** Questions
ALL Questions Carry **EQUAL** Marks (3x10 = 30)

16 A random variable X has Mean JL= 12 and variance a² =9 and an unknown probability distribution. Using Tchebycheff s inequality, find P(6<X<18).

17 The joint probability mass function of (X,Y) is given by P(X, Y) = K (2x + 3y), x = 0,1,2, y = 1, 2, 3. Find the marginal and conditional distributions.

Prove that the Poisson distribution is a limiting case of binomial distribution.

Obtain the MGF of the density f(x) = <{rn ‘-e-V1. 0 < x < GO and
0 otherwise

hence find mean and variance.

Obtain the constant of F distribution.