(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2018

(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 Write any two properties of characteristic function.

2 State the Bernoulli's Law of Large numbers.

3 Define Continuous random variables.

4 If X and Y have joint pdf $f(x, y)$ $\begin{cases} x+y; 0 < x < 1, 0 < y < 1 \\ 0; \text{otherwise} \end{cases}$. Check whether X and Y are independent.

5 Give the physical condition for Binomial Distribution.

6 Define Hyper geometric distribution.

7 Give the probability density function of Rectangular distribution.

8 Define the Beta distribution first kind.

9 Write any two applications of 'f distribution.

10 Write the probability density function of % distribution.

SECTION - B (25 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks (5x5 = 25)

11 a A discrete RV X takes the values -1,0,1 with the probabilities $\frac{1}{8}, \frac{3}{4}, \frac{1}{8}$ respectively. Evaluate $P\{|X - E(X)| > 2\}$ and compare it with the upper bound given by chebyshev inequality.

OR

b If the variables are uniformly bounded then prove that the condition $\lim_{n \to \infty} \frac{B_n}{n^2} = 0$ is necessary as well as sufficient for WLLN to hold.

12 a Let X and Y be two discrete random variable with joint pmf

$P[X = x, Y = y] = \begin{cases} \frac{x+2y}{18}, & x = 1,2; y = 1,2 \\ 0, & \text{otherwise} \end{cases}$. Find the marginal pmf of X and E[X].

OR

Let X and Y be random variable with joint density function

$f(x,y) = \begin{cases} 4xy; 0 < x < 1, 0 < y < 1 \\ 0, \text{otherwise} \end{cases}$. Find E[XY]

13 a State and prove the memory less property of Geometric distribution.

OR

b Find the MGF of Negative binomial distribution.

14 a Describe briefly the properties of Normal distribution.

OR

b Derive the MGF of Gamma distribution.

Cont...

15 a Show that for t-distribution with n d.f mean deviation about mean is given $\frac{\sqrt{nr[(ft-i)/2]}}{4nT(nl2)}$

OR

b Obtain the MGF of $\%^2$ distribution.

SECTION - C (30 Marks)

Answer any **THREE** Questions

ALL Questions Carry **EQUAL** Marks (3 x 10 - 30)

16 Obtain the moment generating function of the density

$$\begin{cases} \frac{1}{x(x+1)} & X = 1,2,... \\ 0, \textit{otherwise} \end{cases}$$

17 If the joint probability density faction of a two dimensional random variable X,Y is given by $f(x, y) = \begin{cases} x + \frac{y}{3}, 0 < x < 1, 0 < y < 2 \\ 0, \textit{elsewhere} \end{cases}$ Find

(i) $P\left(x > \frac{1}{2}\right)$ (ii) $p\{y < 1 \mid x < \frac{1}{2}\}$

18 Obtain the mean and variance of Geometric distribution.

19 Find the moment generating function of the density $f(x) = \begin{cases} iAe^{-u}, x > 0 \\ \{Q, otherwise \end{cases}$ and hence find mean and variance.

20 Obtain the Constants of't' distributiosn.

Z-Z-Z END