Reg. No.....

## SECOND SEMESTER B.Sc. DEGREE (SUPPLEMENTARY/IMPROVEMENT) EXAMINATION, APRIL/MAY 2015

## (UG-CCSS)

## Complementary Course-Statistics

## ST 2C 02-PROBABILITY DISTRIBUTION

Time : Three Hours

Maximum : 30 Weightage

I. Answer all twelve question.

- **1** As  $x \rightarrow -\infty$ , the joint cumulative distribution function F (x, y) of a bivariate random variable
  - (X, Y) becomes :
    - (a) Zero.
    - (b) One.
    - (c) A number between zero and one.
    - (d) None of these.

2 The heights of fathers aid their sons form bivariate variables which are :

- (a) Discrete variables. (b) Continuous variables.
- (c) Pseudo variables. (d) None of these.

3 If X and Y are independent discrete variables, then P  $\{X x, Y y\}$  is equal to:

(a)  $P \{X < x, Y < \dot{y}\}.$  (b)  $P \{X = x, Y = y\}.$ (c)  $P \{X = x\} \cdot P \{Y =$  (d)  $P \{X = x\} \cdot P = y\}.$ 

4 For any bivariate distribution, which of the following is true?

- (a)  $t_{102} = 1 \cdot 20$ . (b)  $t_{11} = t_{22}$ . (c) (d)  $t_{12} = t_{21}$ .
- 5  $E \{XY | Y = 1\} =$ 
  - (a) E(X). (b) E(X | Y = 1).
  - (c) E (X Y). (d) E (X) E(Y).

6 When n = 1, the binomial distribution B (n, p) reduces to — distribution.

(a) Standard binomial.	(b) Pseudo binomial.
(c) Point binomial.	(d) Poisson binomial.

7 The Poisson distribution  $P(\lambda)$  is leptokurtic for :

(a) X > 1 only. (b) All values of X. (c) X < 1 only. (d)  $\lambda \neq L$ 

8 The moment generating function of geometric distribution with parameter p is:

(a) 
$$p(1 - pe^{-t})$$
  
 $p[1 - (1 - p)e^{-t}]$   
(b)  $p(1 - pe^{t})^{-t}$   
(c)  $p[1 - (-p)e^{-t}]$ 

9 For large values of X, the gamma distribution y (X) tends to :

(a) Uniform.(b) Exponential.(c) Normal.(d) Cauchy.

10 Standard deviation of standard exponential distribution is :

(a) 1. (b) 
$$\frac{1}{2}$$

(c)  $\frac{1}{4}$ . (d) None of these.

11 If X is a standard normal variate, then P(X > 5) equals

(a) 0.6.
(b) 0.45.
(c) 0.25.
(d) None of these.

12 If X follows Pareto distribution, then P (X = 0.5) is

- (a) 0.5. (b) 1.
- (c) 0. (d) None of these.

 $(12 \text{ x}^{1}/_{4} = 3 \text{ weightage})$ 

- II. Short Answer Type questions. Answer all nine questions :-
  - 13 Define marginal probability density function.
  - 14 Define conditional distribution function of a continuous random variable Y given X.
  - 15 Define conditional variance of a random variable X given Y.
  - 16 Define joint central moments of a bivariate distribution.
  - 17 Define a degenerate random variable.
  - 18 Obtain second raw moment of discrete uniform distribution.
  - 19 Find the moment generating function of a Bernoulli distribution.
  - 20 Define rectangular distribution.
  - 21 Define Cauchy distribution.

 $(9 \times 1 = 9 \text{ weightage})$ 

III. Short essay or paragraph questions. Answer any five questions :

22 If X and Y are random variables with joint probability density function :

$$f(\mathbf{x}, \mathbf{y}) \begin{cases} e^{-(x^{+v})}, 0 < \mathbf{x}, \mathbf{y} < 0^{o} \\ 0 & \text{, elsewhere,} \end{cases}$$

find P (X > 1).

23 If X, Y, Z are independent and identically distributed random variables, show that E  $(Y - Z)^2 = 2 \text{ Var } (X).$ 

24 Let p(x, y) **1** for x = 1, 2, ..., n and y = 1, 2, ..., n. Verify whether X and Y are independent.

- 25 Establish Renovsky formula.
- 26 Derive the moment generating function fo a Poisson variate. Hence obtain its first four central moments.
- 27 Obtain the median of normal distribution.
- 28 State and prove Bernoulli's law of large numbers.

 $(5 \times 2 = 10 \text{ weightage})$ 

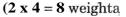
IV. Essay questions. Answer any two questions :

29 Let the joint probability density function of (X, Y) be

f(x, y) = 0, elsewhere.

Find (i) E(Y | X = x); and (ii) Cor(X, Y).

- **30** (a) If X and Y are independent Poisson variates, obtain the conditional distribution of X given X + Y.
  - (b) Find the  $r^{r}$  central moment of normal distribution.
- 31 (a) State and prove Chebyshev's inequality.
  - (b) Briefly explain weak law of large numbers.





N.

16 rab iatest thrille ol, a film -ante, has lear-armed mes paintec it, it proved ( ia's role is be( US. Despite stalled nude defence Robe ed it. Gates's mess understands ulsions", refe Les' objection t eal. Then he h We want Indi egional missil south Asia," The buzz of a etween India n since the fin f George W B ients are expe ontroversy in rill naturally nough for the Indian stra onvinced of