SEAT No. :

P4768

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## S.Y. B.Sc.

# STATISTICS (Semester - III) ST-232: Continuous Probability Distributions (2019 Pattern) (Paper - II) (23172) (Credit System)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of calculator and statistical tables is allowed.
- 4) Symbols and abbreviations have their usual meanings.

**Q1**) Attempt each of the following :

- a) Choose the correct alternative in each of the following : [1 each]
  - i) If a r.v.x has p.d.f.  $f(x) = c; -2 \le x \le 2$  = 0; otherwisethen the value of *c* is A) +2
    B) 1/2 C) 4
    D) 1/4

ii) Let X is a symmetric r.v. with E(X) = m. Then  $E(X-m)^3$  is A) m B)  $m^3$ 

C) 0 D) 1

iii) If  $X \to N(\mu, \sigma^2)$  with  $\mu_4 = 12$  then the value of  $\sigma$  is

- A) 4 B) 2
- C)  $\sqrt{2}$  D) 1

b) State whether the given statement is true or false in each of the following: [1 each]

- i) E(c) = 0 where *c* is any constant.
- ii) Normal distribution is mesokurtic

#### Q2) Attempt <u>any two</u> of the following :

- a) Let X is continuous r.v. with p.d.f. f(x) = 4(1-x)<sup>3</sup>; 0 < x < 1 = 0 ; otherwise
  Find :

  i) E(x) and
  - ii) distribution of  $Y = \frac{X}{1-X}$ .
- b) Obtain point of inflexion of normal probability curve.
- c) If  $X_1, X_2$  are *i.i.d.* Exp(1) then show that  $Y = \min(X_1, X_2) \rightarrow Exp(2)$ .
- Q3) Attempt <u>any two</u> of the following :
  - a) If X is a *r.v.* taking values (-a, a) has p.d.f. f(x) then find the p.d.f. of Y = |X|.
  - b) Obtain mode of N( $\mu$ ,  $\sigma^2$ ).
  - c) The joint p.d.f. of a two dimensional continuous r.v. (X,Y) is

$$f(x, y) = \frac{8}{9}xy \quad ; 1 \le x \le y \le 2$$
$$= 0 \qquad ; otherwise$$

Find :

- i) Marginal distribution of X.
- ii) Conditional distribution of Y given X = x.

2

### [5 each]

[5 each]

**Q4**) Attempt <u>any one</u> of the following :

a) i) The joint p.d.f. of a two dimensional continuous *r.v.* (X, Y) is  

$$f(x, y) = 2$$
;  $0 < x < y < 1$   
 $= 0$ ; otherwise  
Find E(Y|X = x) [7]

ii) If 
$$X \to U[a, b]$$
 then find median of X. [3]

b) i) The p.d.f. of a continuous *r.v.* X is

$$f(x) = \frac{1}{2} ; -1 \le x \le 1$$
  
=0 ; otherwise  
Find *m.g.f.* of X. Also find E(x). [5]

