Progressive Education Society's
Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16
(Autonomous)
End Semester Examination: Nov/Dec 2023
Faculty: Science and Technology

Program: BScGen03 **Semester: III** **SET: A**
Program (Specific): General B.Sc. **Course Type: CC**
Class: S. Y. B.Sc. (General) **Max. Marks: 35**
Name of the Course: Continuous Probability Distributions
Course Code: 23-ST-232 **Time: 2Hr**
Paper: II

Instructions to the candidate:

1) ***There are 5 questions in the question paper. Write each question on separate page.***
2) ***All questions are compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw a well labelled diagram wherever necessary***
5) ***Use of statistical tables and scientific calculator are allowed.***

Q1) Choose the correct alternative in each of the following: **[1x5=5]**

1) If X is a continuous random variable, range of X will be

a) interval of real number
b) finite set of real numbers
c) countably infinite set of real numbers
d) none of the above

2) Joint probability density function of random vector (X, Y) with range set (a,b)X(c,d) is f(x,y), the marginal density function of Y will be

a) $\int_a^b f(x,y)dx$
b) $\int_a^b f(x,y)dy$
b) $\int_c^d f(x,y)dx$
d) $\int_c^d f(x,y)dy$

3) For certain Normal distribution the first two quartiles are 3 and 7 then the third quartile will be

a) 3
b) 7
c) 11
d) 4

4) For Uniform distribution the third order central moment is

a) 0
b) >0
c) <0
d) infinity

5) Mean of certain Exponential distribution is 2 the variance of it

a) 2
b) 4
c) 0.5
d) 0.25

Q2) a) State whether the following is true or false (Any two) **[1 x 2=2]**

1) For U(3,6) distribution mean=3.
2) Exponential distribution attains it maxima at 0(zero).
3) Gamma distribution is asymmetric distribution.

b) Define the following: (Any two) **[1 x 2 =2]**

1) Expected value of function of random variable.
2) Joint distribution function of random vector
3) Inflexion point of normal distribution

Q3) Attempt any two from the following: **[2x4=8]**

1) Find Median if the probability function of random variable X is f(x) =2(1-x), 0<x<1.

2) The joint probability function of random vector (X, Y) is f(x,y) =1 , 0<x, y<1.
Find P(X<0.5, Y>0.5).

3) For certain U (2,6) distribution mean and variance.

4) E(X) =10 and Var(X) =25 find E (2X+3), Var(2X+3).

5) For N (10, 16) distribution find P(X <12).

6) State the distribution function of exponential distribution.

Q4) Attempt any two from the following: **[4x2=8]**

1) Find c if the probability function of random variable X is $f(x) = c(1-x)^2$, 0<x<1.

2) The joint probability function of random vector (X, Y) is f(x,y) =4xy , 0<x,y<1.
find E(X).

3) For certain U(a,b) distribution show that the third ordered central moments are zero.

4) Find the quartiles of N(6,9) distribution.

5) For $N(10,\sigma^2)$ distribution find P(X <12) =0.6. find P(X>8).

6) For exponential distribution with mean=4 find P(X>12|X>10).

Q5) Attempt any two from the following: **[5x 2=10]**

1) Find $E(X^r)$ if the probability function of random variable X is f(x) =2(1-x) , 0<x<1 hence find variance of X.

2) Define independent random variables. If X and Y are independent show that E(XY)= E(X)E(Y).

3) Derive moment generating function of standard normal variable.

4) Find mean and variance of Gamma distribution.

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