Sanjivani Rural Education Society's

Sanjivani College Of Engineering, Kopargaon

(An Autonomous Institute Affiliated by SPPU)

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SY BTECH EM-III SEM-4 (Comp/IT/ECE/MTX)

Tutorial 5

Continuous Random Variable

1. Find cdf $F(x)$ and constant C if pdf is

$$f(x) = \begin{cases} Cx^2, & 1 \le x \le 2 \\ Cx, & 2 < x < 3 \\ 0, & \text{otherwise} \end{cases}$$

2. If distribution function $F(x)$ of a random variable X is

$$F(x) = \begin{cases} Cx^3, & 0 \le x < 3 \\ 1, & x \ge 3 \\ 0, & x < 0 \end{cases}$$

Find constant C, the probability density function and $P(X < 1)$.

3. The pdf of random variable X is

$$f(x) = \begin{cases} \frac{1}{3}(1+4x), & 0 \le x \le 1 \\ 0, & \text{otherwise} \end{cases}$$

find *i)* $E(X)$, *ii)* $E(X^2)$, *iii)* $E(10X+7)$, *iv)* $E(X^2+5X)$, *v)* $var(X)$, *vi)* σ

4. The pdf of random variable X is

$$f(x) = \begin{cases} xe^{-x}, & 0 \le x \\ 0, & \text{otherwise} \end{cases}$$

find *i)* $E(X)$, *ii)* $E(X^2)$, *iii)* $E(4X+15)$, *iv)* $E(X^2+8X)$, *v)* $var(X)$, *vi)* σ.

5. If the monthly machine repair and maintenance cost X in a certain factory is known to be normal with mean Rs. 12000 and stadard deviation Rs. 2000, find the probability that the repair cost for the next month will exceed the budgeted amount of Rs. 15000.

6. In a normal distribution 7% of items are under 35 and 89% are under 63, Find the mean and standard deviation. (Given A(1.48)=0.43,A(1.23)=0.39)

7. The joint probability function of two continuous random variables X and Y is given by,

$$f(x,y) = \begin{cases} C(x+y), & 0 \le x \le 3, 1 \le y \le 3 \\ 0, & \text{otherwise} \end{cases}$$

Find i) Constant C, ii) $P(X > 2, Y < 3)$, iii)$P(1 \leq X \leq 2, Y \leq 2)$, iv)$P(X \geq 2)$ v) $P(Y < 2)$ iv) marginal probability function of X and Y. Also determine whether X and Y are independent.

8. The joint probability function of two continuous random variables X and Y is given by,

$$f(x,y) = \begin{cases} Ce^{-10(x+y)}, & x > 0, y > 0 \\ 0, & \text{otherwise} \end{cases}$$

Find i) Constant C, ii) $P(1 < X < \infty)$, iii)$P(5 \leq X \leq \infty, Y \leq 2)$, iv)$P(X \geq 1)$ v) $P(Y < 2)$ iv) marginal probability function of X and Y. Also determine whether X and Y are independent.