SNS COLLEGE OF ENGINEERING

Coimbatore – 641 107

IAE I Question Bank

Unit-I

PART A

1. State Baye's theorem.
2. Define discrete and Continuous random variable.
3. A CRV X that can assume any value between x=2 and x=5 has a density function given by f(x) = k (1+x). Find k.
4. The mean of a Binomial distribution is 20 and S.D is 4. Determine the parameters of the distribution.
5. Define Poisson distribution and write its mean and variance
6. State Memoryless property of Exponential Distribution

Unit-II

Part-A

7. The joint probability mass function of a two dimensional random variable (X,Y)is given by p(x,y)= k(2x+y), x =1,2 y=1,2, where K is constant. Find the value of k
8. The joint pdf of a random variable (X,Y) is $f(x,y) = ke^{-(2x+3y)}; x > 0, y > 0.$ Find the value of k.
9. The joint pdf of random variable (X,Y) is given as $f(x,y) = \frac{1}{x}, 0 < x < y < 1$ Find the marginal pdf of Y.

Unit-I

Part-B

10. A random variable x has the following probability distribution

x	0	1	2	3	4	5	6	7
P(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2$+K

(i) Find the value of K
(ii) Evaluate P[X<6] and P[X$\geq$ $\mathbf{6}$)
(iii) If P[X$\geq$ $\boldsymbol{C}$)>1/2 find minimum value of C
(iv) Evaluate P[1.5<x<4.5/x>2]

11. Find the MGF of Binomial distribution. Hence find its Mean and variance.
12. Derive the MGF of Poisson distribution and hence find its mean & variance
13. Derive the moment generating function as exponential distribution from that find mean and variance of exponential distribution
14. Out of 800 families with 4 children each how many families would be expected to have
    i. 2 Boys and 2 Girls
    ii. At least 1 boy
    iii. At most 2 girls
    iv. Children of both gender,

    Assume equal probabilities for boys and girls.
15. The number of monthly breakdowns of a computer is a random variable, having a Poisson distribution with mean equal to 1.8. find the probability that this computer will function for a month.
    i. Without a breakdown
    ii. With only one breakdown
    iii. With atleast one breakdown
16. The time (in hours) required to repair a machine is exponentially distributed with parameter $\lambda=1/2$
    (i)What is the probability that the repairs time exceeds 2 hour?
    (ii) What is the conditional probability that the repair takes 10 hour given that its duration exceeds 9 hour?

Unit-II

Part-B

1. The joint probability mass function of (X Y), is given by p(x,y)=k(2x+3y)
   x = 0,1,2; y=1,2,3. Find k and all the marginal and conditional probability distributions. Also find the probability distribution of X+Y
2. The joint probability mass function of (X Y), is given by p(x,y)=$\frac{1}{72}$(2x+3y)
   x = 0,1,2; y=1,2,3. Find k and all the marginal and conditional probability distributions.
3. The joint pdf of the random variable (X,Y) is given by $f(x,y) = Kxye^{-(x^2+y^2)}, x. > 0, y > 0.$ Find the value of K and also prove that X and Y are independent.
4. Given the joint pdf of X and Y $f(x,y) = \begin{cases} cx(x-y), 0 < x < 2, -x < y < x \\ 0\, otherwise \end{cases}$,
   i. Evaluate c
   ii. Find Marginal pdf of X and Y.

   Find the conditional density of Y/X.