Reg. No. : | | | | | | | | | | |

Question Paper Code: 44024

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fourth Semester

Electronics and Communication Engineering

14UMA424 - PROBABILITY AND RANDOM PROCESS

(Regulation 2014)

Duration: One hour Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The probability of impossible event is
   (a) 1 (b) 0 (c) 2 (d) 0.5

2. In which probability distribution, Variance and Mean are equal?
   (a) Binomial (b) Poisson (c) Geometric (d) None of these

3. If two random variables X and Y are independent, then covariance is
   (a) θ (b) 1 (c) 0 (d) λ

4. If $X=Y$ then correlation coefficient between them is
   (a) 0 (b) ∞ (c) 1 (d) ± 1

5. Every Strongly stationary process of order 2 is a
   (a) Orthogonal process (b) Stationary Process
   (c) WSS Process (d) None of these

6. If both T and S are discrete, then the random process is called
   (a) stationary (b) discrete random sequence
   (c) random process (d) Poisson process

7. Autocorrelation function is an _____ function.
   (a) odd (b) even
   (c) neither Even nor odd (d) stationary

8. If $R_{xy}(\tau) = \mu_X \times \mu_Y$ then *X(t)* and *Y(t)* are called

(a) Independent (b) Orthogonal

(c) Stationary (d) none of these

9. Which of the following system is Causal?

(a) $y(t)=x(t+a)$ (b) $y(t)= x(t-a)$

(c) $(t)= a\ x(t+a)$ (d) $y(t)= x(t) – x(t-a)$

10. Colouted Noise means a noise that is

(a) white (b) not white

(c) coloured (d) none of these

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. If the probability density function of a random variable *X* is given by $f(x) = K x^2 e^{-x}, x \geq 0$. Identify the value of *K*, r^{th} moment, Mean and Variance. (8)

12. If the joint probability density function of a two dimensional random variable (X,Y) is given by $f(x, y) = xy^2 + \frac{x^2}{8}, 0 \leq x \leq 2, 0 \leq y \leq 1$.

Find out (i) P(X > 1) , (ii) P(Y< ½). (8)

13. Explain the classification of random process. (8)

14. Define cross-correlation function and write the properties of cross-correlation function. (8)

15. Show that $S_{yy}(\omega) = S_{xx}(\omega)|H(\omega)|^2$ where Sxx(ω) and Syy(ω) are the power spectral density functions of the input *X(t)*, output *Y(t)* and $H(\omega)$ is the system transfer function. (8)