R18

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Regular Examinations October-2020
PROBABILITY THEORY AND STOCHASTIC PROCESSES
(Electronics & Communication Engineering)

Time: 3 hours   Max. Marks: 60

PART-A
(Answer all the Questions 5 x 2 = 10 Marks)

1 **a** Define Exhaustive event & mutually exclusive event.   **2M**
   b Define joint moments about the origin.   **2M**
   c What is a stationary process? Explain.   **2M**
   d Show that the power spectral density is an even function.   **2M**
   e Explain mean value of output response.   **2M**

PART-B
(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2 **a** State and prove Bayes theorem of probability.   **5M**
   b Define distribution and density function. State its properties.   **5M**

OR

3 **a** Explain the different types of random variables.   **5M**
   b Discuss Rayleigh and exponential distribution functions.   **5M**

UNIT-II

4 **a** Random variable X and Y have the density: **5M**
   $f_{X,Y}(x,y)$ = 1/24 ; for 0<X<6, 0<Y<4
                  0 ;   elsewhere
   What is the expected value the function $g(X,Y)=(XY)^2$?
   b Briefly explain about jointly Gaussian random variables.   **5M**

OR

5 Two random variable X and Y with joint density function   **10M**
$$f_{X,Y}(x,y) = Ae^{-(2x+y)}, x > 0, y > 0$$
                  0   Otherwise
i)Find 'A' ii)Find Marginal density functions?

UNIT-III

6 Explain about first order, second, wide-sense and strict sense stationary process.   **10M**

OR

7 **a** Show that the auto correlation function of a stationary random process is an even   **6M**
   function of τ.
   b Give the classification of random processes.   **4M**

UNIT-IV

8 **a** State and Prove the properties of Power density Spectrum? **6M**

b Derive the power spectral density at zero frequency is equal to the area under the curve of the autocorrelation $Rxx(\tau)$? **4M**

OR

9 **a** The power spectral density of a stationary random process is given by **5M**

$S_{xx}(\omega) = A$; $-k < \omega < k$

       0; otherwise Find the auto correlation function.

b State and Prove the properties of cross-correlation function. **5M**

UNIT-V

10 **a** Explain about LTI system. **5M**

b Find the power density spectrum of response of a linear system. **5M**

OR

11 Derive the expressions for mean. Autocorrelation, cross correlation and PSD of response of a linear System **10M**

END