**R18**

Reg. No: ☐☐☐☐☐☐☐☐☐☐

## SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
### (AUTONOMOUS)
**B.Tech II Year II Semester Supplementary Examinations February-2022**
### 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 | What are the conditions for a function to be a Random variable? | 2M |
| | b | Define joint moments about the origin. | 2M |
| | c | Write the condition two WSS process X(t) and Y(t) are jointly wide sense stationary. | 2M |
| | d | Derive the formula for power spectral density is an even function. | 2M |
| | e | Write on a brief note on auto correlation function of output response. | 2M |

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

#### UNIT-I

| | | | |
|---|---|---|---|
| 2 | a | Define probability (i) Mathematical approach　(ii) Relative frequency approach　(iii) Set theory approach. | 5M |
| | b | When are two events said to be mutually exclusive? Explain with an example. | 5M |

**OR**

| | | | |
|---|---|---|---|
| 3 | a | State and prove Baye's theorem of probability. | 5M |
| | b | Explain conditional distribution and density function .State its properties. | 5M |

#### UNIT-II

| | | | |
|---|---|---|---|
| 4 | a | Define and explain joint distribution function and joint density function of two random variables X and Y. | 5M |
| | b | State and prove the properties of joint distribution function. | 5M |

**OR**

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|---|---|---|---|
| 5 | The joint probability density function of two random variables X and Y is given by $f_{XY}(x,y) = c(2x+y)$　　$0 \le x \le 1$ ; $0 \le y \le 2$　　0　　Otherwise (i) Find 'c'　　(ii) Find Marginal density functions | 10M |

#### UNIT-III

| | | | |
|---|---|---|---|
| 6 | a | Give the classification of random processes. | 5M |
| | b | State the conditions for wide sense stationary random process. | 5M |

**OR**

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|---|---|---|---|
| 7 | a | What is Auto Correlation Function? State and explain any four properties of Auto Correlation Function. | 10M |

#### UNIT-IV

| | | | |
|---|---|---|---|
| 8 | a | Discuss the relation between cross power spectrum and cross correlation function. | 5M |
| | b | Find the cross correlation of functions $\sin\omega t$ and $\cos\omega t$. | 5M |

**OR**

| | | | |
|---|---|---|---|
| 9 | a | The power spectral density of a stationary random process is given by $S_{xx}(\omega) = A$;　　$-k < \omega < k$　　0;　　otherwise Find the auto correlation function. | 5M |
| | b | Discuss the properties of power spectral density. | 5M |