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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2021

PROBABILITY THEORY AND STOCHASTIC PROCESSES

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 60

PART-A

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

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| 1 | a | Explain about certainty and uncertainty with suitable examples. | 2M |
| | b | Define the expected value of a function of two random variables. | 2M |
| | c | What is a stationary process? Explain. | 2M |
| | d | Write some properties of auto Power density Spectrum. | 2M |
| | e | Define a linear system. | 2M |

PART-B

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

UNIT-I

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| 2 | a | Define the following with examples.
i. Sample space ii. Event iii. Mutually exclusive events iv. Independent events. | 5M |
| | b | Discuss Joint and conditional probability. | 5M |

OR

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| 3 | a | Explain the different types of random variables. | 5M |
| | b | Define distribution and density function. State its properties. | 5M |

UNIT-II

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| 4 | | Explain conditional distribution and density function –point conditioning and interval conditioning? | 10M |
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| 5 | a | Briefly explain about jointly Gaussian random variables. | 5M |
| | b | Explain the sum of two random variables and multiple random variables | 5M |

UNIT-III

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| 6 | | A random process is defined by $x(t) = At$ where A is a continuous random variable uniformly distributed on (0,1) and 't' represents time. Find
(i) $E[x(t)]$ (ii) $R_{xx}[t, t + \tau]$ (iii) Is the process stationary? | 10M |
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| 7 | | What is cross correlation function of a random process? state and explain any four properties of Cross correlation function of a random process? | 10M |
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UNIT-IV

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| 8 | | State and prove properties of power density spectrum. | 10M |
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| 9 | a | Briefly explain the concept of cross power density spectrum. | 5M |
| | b | Discuss the properties of cross power density spectrum. | 5M |

UNIT-V

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| 10 | | Derive the expressions for mean, Autocorrelation, cross correlation and power spectral density of response of a linear system | 10M |
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OR

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| 11 | a | Write different types of band pass processes with band-limited processes. | 5M |
| | b | Give any two spectral characteristics of the system response. | 5M |

END