R09

Code No: 09A30401

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B.Tech II Year I Semester Examinations, May/June-2013
Probability Theory and Stochastic Processes
(Common to ECE, ETM)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a) Define and explain the following with example
i) Sample space
ii) Discrete sample space
iii) Continuous sample space.
b) A speaks truth in 75% and B in 80% of the cases. In what percentage of cases are they likely to contradict each other narrating the same incident? [15]

2.a) State and prove any four properties of probability density function.
b) A random variable X has probabilities shown in table.

X	-3	-2	-1	0	1	2
P(X)	0.2	0.5k	k	0.1	0.3k	k

i) Find the value of k
ii) Find $F_X(x)$. [15]

3.a) State and prove any three properties of moment generating function.
b) Find the characteristic function of a uniformly distributed random variable X in the range [0, 1]. [15]

4.a) Define and explain conditional probability mass function. Give its properties.
b) The joint distribution of X and Y is given by
$f(x) = 4xye^{-(x^2+y^2)}, x \geq 0, y \geq 0$.
Show that X and Y are independent random variables. [15]

5.a) State and prove the properties of correlation function.
b) Define covariance of random variables X and Y and explain correlation coefficient. [15]

6.a) Explain the concept of random process.
b) Distinguish between stationary and non-stationary random process.
c) Explain the classification of random process with neat sketches. [15]

7.a) Derive the relationship between autocorrelation and power spectral density.
b) State and prove any four properties of power spectral density of random process. [15]

8. Write short notes on:
a) Effective noise temperature.
b) Narrowband noise.
c) Noise figure.

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