Code: 9A04303

R09

B.Tech II Year II Semester (R09) Supplementary Examinations May/June 2017

PROBABILITY THEORY & STOCHASTIC PROCESSES

(Electronics & Computer Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) What is Baye's theorem? Explain.
(b) Explain the terms of joint and conditional probabilities.

2 Define and explain the Gaussian random variable in brief.

3 (a) Random variable x has density function $f_x(x) = \frac{1}{a}e^{-b|x|} for -\infty < x < \infty$. Find E(X), E($X^2$) and variance.
(b) State the Chebyshev's inequality and prove the same for k>0.

4 (a) Distinguish between joint distribution and marginal distribution.
(b) The joint probability density function of two random variables X and Y given by

$$f(x,y) = \begin{cases} a(2x+3y^2), 0 \le x \le 2 \le y \le 4, \\ 0 \quad\quad\quad\quad , elsewhere \end{cases}$$

Find: (i) Value of a. (ii) P(X≤1, Y>3)

5 Obtain the relationship between marginal and joint characteristics function.

6 Discuss in detail about:
(a) First order stationary random process.
(b) Second order and wide sense stationary random process.

7 (a) Explain the classification of random process with neat sketches.
(b) State the condition for wide sense stationary random process.

8 Calculate PSD of a stationary random process for which the auto correlation is $R_{XX}(\tau) = 6^V e^{\alpha|\tau|}$ auto correlation function of an periodic power signal is $R_{XX}(\tau) = exp\left(\frac{-\tau^2}{26^2}\right)$. Find the PSD and normalized average content of the signal.

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