TE - Sem-V - CBSGS - EXTC - PSA

18/11/15

QP Code : 5579

Time 03 hours.

Max Marks: 80

Instructions to candidate

1. Q 1 is compulsory
2. Attempt any THREE from remaining
3. Figures to the right indicate full marks
4. Assume suitable data if necessary

1 a] Explain concept of power spectral density 5

b] state and prove Central Limit Theorem 5

c] Explain properties of cross correlation function 5

d]state and prove Bayes' theorem 5

2 a] Box 1 contains 5 white balls and 6 black balls. Box 2 contains 6 white & 4 black balls 10
A box is selected at random and then a ball is chosen at random from the selected
Box (i)What is the probability that the ball chosen will be a white ball
(ii)Given that the ball chosen is white what is the probability that came from box1

b] Give the properties of CDF, pdf, and PMF. 10

3 a] Explain concept of conditional probability and properties of conditional probability 10

b] Explain what do you mean by? 03
(i)Deterministic system
(ii) stochastic system
(iii) Memoryless system

c] Prove that if input to memoryless system is strict sense stationary(SSS) process then 07
output is also strict sense stationary

4 a] Explain Random process, define ensemble mean, Auto correlation and Auto covariance of the process in terms of indexed random variables in usual mathematical forms 10

b] Let Z=X+Y Determine pdf of Z $f_Z(Z)$ 10

5a] state and prove Chapman Kolmogorov equation 10

b] Explain Chebyshev's Inequality with suitable example. 10

TURN OVER

6] a] The joint probability density function of two random variables is given by

$F_{xy}(x, Y)=15\, e^{-3x-3y}$; $x \geq 0, y \geq 0$

i) Find the probability that $x<2$ and $Y>0.2$
ii) Find the marginal densities of X and Y
iii) Are X and Y Independent?
iv) Find E(x/y) and E(y/x) 10

b] Write short Notes on following special distributions

i)Poisson distributions ii) Rayleigh distributions iii) Gaussian distributions 10

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