T.E EXTC sem V (CBGS) 18/11/15
RSA

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 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	10
	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? (i)Deterministic system (ii) stochastic system (iii) Memoryless system	03
	c] Prove that if input to memoryless system is strict sense stationary(SSS) process then output is also strict sense stationary	07
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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