B.Tech II Year I Semester Examinations, February/March - 2016 PROBABILITY THEORY AND STOCHASTIC PROCESSES (Common to ECE, ETM) 10000 Time: 3 Hours NAME OF STREET Max. M: 75 M. Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 Marks. Answer all questions in Part A. NEW T Part B consists of 5 Units. Answer any one full question from each unit. CHIE Each question carries 10 Marks and may have a, b, c as sub questions. 2000 PART - A [25 Marks] 20 1.a) Define a random variable. [2] State theorem of total probability. b) [3] M. Write the expression for pdf of a Poisson random variable. ć) [2] we. Define Moment generating function and present generation of moments using it. d) [3] State central limit theorem for the case of unequal distributions. [2] BPL Write short notes on jointly Gaussian random variables for 2 variable case.[3] What is an ergodic random process? g) [2] Write short notes on Poisson random process. h) [3] Define cross power spectral density. 1) Del pur [2] S.C. Write the properties of power spectral density. j) [3] [50 Marks] PART - B gr. 50 Consider an experiment of drawing two cards at random from a bag containing 2.a) four cards marked with the integers I through 4. (i) Find the sample space 8, of the experiment if the first card is replaced before 64 the second is drawn. (ii) Find the sample space S, of the experiment if the first card is not replaced. Explain relative frequency approach of probability. b) [5+5] or. 257 OR 1911 A Company producing electric relays has three manufacturing plants producing 3. 50, 30, and 20 percent, respectively, of its product. Suppose that the probabilities that a relay manufactured by these plants is defective are 0.02, 0.06, and 0.015, 257 NAME OF respectively. a) If a relay is selected at random from the output of the company, what is the probability that it is defective? b) If a relay selected at random is found to be defective, what is the probability. that it was manufactured by plant 3? [5+5] Obtain the characteristic function of a uniformly distributed random variable. 4.a) Obtain the variance of Poisson random variable. 6). [5+5] A random variable X uniformly distributed in the interval  $(0,\pi/2)$ . Consider the 5.a) transformation Y= Cos X, obtain the pdf of Y. Obtain the characteristic function of Poisson random variable. [5+5] 95% K 82 STREET BR. Marker Sulf

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	6.a)	where X	l and $X2$ a	transformate independent	dent rande	en by Y <sub>1</sub> om variable	$= X_1 - 3X$ es. Obtain	$X_2, Y_2 = -$ the joint of	$2X_1+3X_2$ lensity of	
STATE OF THE STATE	6)	$Y_1, Y_2$ in terms of joint density of $X_1, X_2$ .  Prove the joint characteristic function of two independent random variables is equal to the product of marginal characteristic functions.  [5+5]  OR								(2) 21 T.
	7.a) b)	Define co	variance o	of joint der of random value of X	nsity funct ariables X,	ion. Y and der	ive the rela	tionship b	etween [5+5]	
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	9.a) b)	Check wh	ether the	es of covari random pro ited in the in	ance.	= Acos(ω <sub>o</sub> 3π/2).	t+ <del>0</del> ) is WS	SS of not?	Given θ [5+5]	STATES STATES STATES STATES
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	11.a)	The power	r spectral c	lensity of a	OR WSS Pand	om proces	s is π[δ(ω-	$\omega_{o}$ ) + $\delta(\omega$	+ ω <sub>o</sub> )].	
BOBYE NAMES	<b>b</b> )	Find its au	itocorrelati	on function ower in the	ı. 🏣 /					48. 275. 10. 25.
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