Code No: 123BT

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD B.Tech II Year I Semester Examinations, March - 2017 PROBABILITY THEORY AND STOCHASTIC PROCESSES (Common to ECE, ETM)

			(Comin	non to ECE, Em			
Time:	3 Hours	T.N. 9432	111 172 TO THE TOTAL THE TOTAL TO THE TOTAL TOTAL TO THE		Max. Marks: 75		
Note:	This quest	tion paper contai	ns two pa	orts A and B.			
11010.	Part A is c	compulsory whic	h carries	25 marks. Answe	r all questions in Pa	rt A.	
					ion from each unit.		
				may have a, b, c			
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, , , , , , , , , , , , , , , , , , ,	**			PART – A		(25 Marks)	
1.a)	Define Ra	ndom variable.				[2]	
b)	Write abo	ut the continuous	and mix	ed random variab	oles.	[3]	
c)	Mention th	he difference bet	ween the	Variance and Ske	ew.	[2]	
d)	Write abo	ut the Rayleigh d	ensity an	d distribution fun	ction.	[3]	. 1. 5
e):		e equal and unec			C. 15.	(L) [7[2]	
f)				of Gaussian rando	m variables.	[3]	
g)		ne properties cov				[2]	
h)		$S_{xx}(\omega) = S_{xx}(-\omega)$				[3]	
i)		er-Khinchin rela		*	1	[2]	
j):	Express th	e relationship be	tween po	wer spectrum and	autocorrelation.	[3]	
*,,,* )	*.	'wa' 3 "s	*,* ; *.	DADT D	"and" it "s	faction is	1967.2
			n (8)	PART - B		(50 Marks)	
2 -1	Diagram th	a mantually avalu	oiva avan	ita with an axamn	ام	(50 Marks)	
2.a)		bability, set and		its with an examp	ic.	[5+5]	
b)	Define pro	boadinty, set and	sample s	OR	N. C. MORE	[5,5]	
3.	Write the	classical and ax	iomatic c		bability and for a t	hree digit decimal	
J.	number ch	osen at random	find the	probability that	exactly K digits ar	e greater than and	
		for $0 < K < 3$ .	,	[		[10]	
	oqua. to o,						
4.a)	Obtain the	relationship bety	ween prol	bability and proba	ability density funct	ion.	
b)	Find the	moment genera	ting fun	ction of the rai	ndom variable wh	ose moments are	
****	$m_r = (r + 1)$		Section 1	> < x × <	***** 5 ***	[5+5]	199
				OR			
5.a) b)	Write about Determine	it Chebychev's is the moment gen	nequality erating fu	and mention abounction about orig	ut its characteristic gin of the Poisson di	function. stribution. [5+5]	
	5.00			1			
6.a)			narginal c	iistribution functi	ons, conditional dis	undunion functions	in h
1.	and densiti	ies.		whara v ba a uni	formly distributed t	andom variable in	
b)					formly distributed i	[5+5]	
	the interva	l ( $-\pi$ , $\pi$ ). Find f <sub>y</sub>	(y) and E	-[y].			

Max. Marks: 75

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Time: 3 Hours

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Note	This question paper control Part A is compulsory when Part B consists of 5 Units Each question carries 10	ich carries 25 ma s. Answer any on	irks. Answer all que full question fro	m each unit.		
;;;;	R SR	PAR	$\mathbf{T} = \mathbf{A}$		(25 Marks)	
1.a) b) c) d) e) f) g) h)	Define Random variable. Write about the continuo Mention the difference be Write about the Rayleigh Explain the equal and unwrite about linear transformation the properties conshow that $S_{xx}(\omega) = S_{xx}(-State wiener-Khinchin resource)$	us and mixed ranetween the Varial density and distribution ormations of Gauovariance.	nce and Skew. ribution function. ns.	ables.	[2] [3] [2] [3] [2] [3] [2] [3]	
j);	Express the relationship l		pectrum and autoc	orrelation.	[3]	
		PAR	Т - В		(50 Massles)	
2.a) b) 3.	Discuss the mutually exc Define probability, set an Write the classical and a number chosen at random equal to 5, for 0< K < 3.	d sample spaces.  Ouxiomatic definit m, find the prob	OR CARRELIANT IN THE PROPERTY OF Probability that exactly	y K digits are gi	reater than and [10]	
4.a) b):	Obtain the relationship be Find the moment gene $m_r = (r + 1)!2^r$ .	rating function	y and probability of the random	density function. variable whose	moments are [5+5]	
5.a) b)	Write about Chebychev's Determine the moment go	inequality and n	nention about its c	haracteristic fund he Poisson distrib	ction. bution. [5+5]	
6.a):	Differentiate between the and densities. Given the transformation the interval $(-\pi, \pi)$ . Find	$y = \cos x$ where $f_y(y)$ and $E[y]$ .				

Let X be a random variable defined, Find E [3X] and E[X2] given the density function as  $f_x(x) = (\pi/16)\cos(\pi x/8), -4 \le x \le 4$ [10]elsewhere State and prove properties of cross correlation function. 8.a) b). . . . If the PSD of X(t) is  $S_{xx}(\omega)$ , Find the PSD of dx(t)/dt. [5+5]OR A random process  $Y(t) = X(t) - X(t + \tau)$  is defined in terms of a process X(t). That is at least 9. wide sense stationary. a) Show that mean value of Y(t) is 0 even if X(t) has a non Zero mean value. b) If  $Y(t) = X(t) + X(t + \tau)$  find E[Y(t)] and  $\sigma Y^2$ . [5+5]The auto correlation function of a random process X(t) is  $R_{XX}(\tau) = 3+2 \exp(-4\tau^2)$ . 10. a) Evaluate the power spectrum and average power of X(t). b) Calculate the power in the frequency band  $-1/\sqrt{2} \le \omega \le 1/\sqrt{2}$ [5+5]Derive the relation between PSDs of input and output random process of an LTI system. 11. [10] ---00O00---