University Institute of Engineering & Technology
(A Constituent Autonomous Institute)
Kurukshetra University, Kurukshetra
THEORY EXAMINATION – DECEMBER 2015
B. Tech (ELECTRONICS AND COMMUNICATION) 3rd Semester

COURSE NO.:ECE-201   COURSE TITLE:SIGNALS AND SYSTEMS

M.M. 75   TIME 3 HRS

PART-A (TIME 30 MINUTES)

1. Answer the following multiple choice questions   15

1	The signal x(t) if multiplied by unit impulse function i.e. $x(t).\delta(t)$ is equal to		
	(a) $x(0)$	(b) $x(t).\delta(0)$	
	(c) $x(0).\delta(t)$	(d) $x'(0)$	
2	The fundamental time period of signal $x(t) = \cos(20t+1) + \sin(2t+1)$		
	(a) π	(b) $\pi/2$	
	(c) 1	(d) ½	
3	The system having input x(t) and output y(t) as $y(t) = \cos(t+1) * x(t+1)$ is		
	(a) Causal and Dynamic	(b) Causal and Static	
	(c) Non Causal, Static and Unstable	(d) Non Causal, Dynamic and stable	
4	The signal $x[2-3n]$ can be obtained from signal $x[n]$ by using the operators in precedence order as		
	(a)Time scaling, Time shifting, Time inversion	(b) Time shifting, Time scaling, Time inversion	
	(c) Time inversion, Time scaling, Time shifting	(d)None of the above	
5	Convolution is used to find		
	(a)The impulse response of an LTI system	(b) The frequency response of a system	
	(c) The time response of an LTI system	(d) The phase response of an LTI system	
6	The unit step signal u(t) is given as		
	(a) $dr(t)/dt$	(b) 1 for $t \leq 0$	
	(c) 1 for $t \geq 0$	(d) none of the above	
7	Which of the following equation is false		
	(a) $|R_{xy}(\tau)| \leq R_{xx}(0)$	(b)$R_{xx}(0)=P_x$	
	(c) $R_{xy}(\tau)= R_{yx}(\tau)$	(d) $R_{xx}(\tau)= R_{xx}(-\tau)$	
8	The Fourier series of a real, even periodic signal will contain only		
	(a) cosine terms	(b) sine terms	
	(c) Even terms	(d) Odd harmonics	
9	The Fourier transform of a unit step function		
	(a) 1	(b) $\pi\delta(w)+ 1/jw$	
	(c)$1/jw$	(d) jw	
10	Which of the following equation is false for Fourier transform of signal x(t) ?		
	(a) $FT[x(t)e^{jw_0t}]= X(w+w_0)$	(b) $FT[x(at)]= 1/|a| * X(w/a)$	
	(c) $FT[dx(t)/dt]=jwX(w)$	(d) $FT[x(-t)]=X(-w)$	
11	The DTFT of $\delta[n-1]+\delta[n+1]$ is		
	(a)$\cos(w)$	(b) $2*\cos(w)$	
	(c) 1	(d) $\cos(2*w)$	
12	The nyquist rate of the signal $x(t)=\cos(200\pi t)+\sin(300\pi t)$ is		
	(a) 100 Hz	(b) 150 Hz	
	(c) 200 Hz	(d) 300 Hz	
13	The laplace transform of $t^n u(t)$ is		
	(a) n/s^n	(b) $n!/s^n$	
	(c) $n!/s^{n+1}$	(d) $n+1/s^n$	
14	The fourier transform of a signal x(t) equals laplace transform of signal x(t)		
	(a) iff $\sigma = 0$	(b) iff $\sigma = 1$	
	(c) iff $\sigma = -1$	(d) none of the above	
15	Region of convergence of a causal LTI system		
	(a) is the entire s-plane	(b) is Right Half of s-plane	
	(c) Left half of s-plane	(d) strip parallel to the jw axis	

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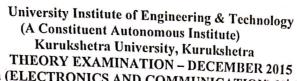B. Tech (ELECTRONICS AND COMMUNICATION) 3rd Semester
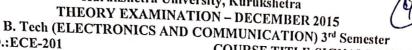COURSE NO.:ECE-201
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PART B &C (TIME 2H 30 MIN)

PART-B

SECTION-I : All compulsory 2 question from each Unit		20
	UNIT-I	
2	Determine the power of signal $x[n]=\cos((\pi/4)n)$	2.5
3	Explain periodic signals with its properties.	2.5
	UNIT-II	
4	Explain the properties of probability distribution function and Probability density function.	2.5
5	Find the convolution of two sequences $x[n]=(0.8)^n u[n]$ and $h[n]=(0.4)^n u[n]$	2.5
	UNIT-III	
6	Determine the a_o, a_n and b_n for odd signals.	2.5
7	Determine the Fourier series coefficients for discrete-time periodic Square wave $x(n)=1$ for $-N_1 \le n \le N_1$.	2.5
	UNIT-IV	
8	Find the Fourier transform of $x(t)=\exp(t)*\cos(w_c t)*u(t)$	2.5
9	Explain ROC and its properties.	2.5

PART-C

SECTION-II : Attempt Four Questions in all Selecting at least One question from each Unit		
	UNIT-I	
10	Explain singular functions and their relations with each other.	10
11	a) Explain linear systems and Time-invariant systems.	5
	b) Determine whether the system with input $x(n)$ and output $y(n)$ is $y(n)=x(n^2)$ i)Causal ii) Static iii) Linear iv)Time invariant v) Stable	5
	UNIT-II	
12	Explain correlation functions and its properties with proof.	10
13	Consider an LTI system S and a signal $x(t)= 2e^{-3t}u(t-1)$. If $x(t) \rightarrow y(t)$ and $dx(t)/dt \rightarrow -3y(t)+e^{-2t}u(t)$ Then determine the impulse response h(t) of S.	10
	UNIT-III	
14	(a) Find the exponential fourier series for the signal $$x(t) = \begin{cases} A\sin(t) , 0 < t < \pi \\ 0 , \quad \pi < t < 2\pi \end{cases}$$	5
	(b) Explain reconstruction of a signal from its samples using Interpolation	5
15	Find the trigonometric Fourier series for the triangular wave given by $$x(t)=\begin{cases} 1-t, \ 0<t<1 \\ t-1, \ 1<t<2 \end{cases}$$ Also plot the line spectrum.	10
	UNIT-IV	
16	State and Prove five properties of CTFT.	10
17	a) State the initial-value and final value theorems of Laplace transform	5
	b) Compute the initial and final values for $X(s)= 3s+4/s(s+1)(s+2)^2$	5