Code: 13A04302 **R13**

B.Tech II Year I Semester (R13) Regular & Supplementary Examinations December 2015

SIGNALS & SYSTEMS

(Common to ECE and EIE)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Find the frequencies present in a signal x(t) = sin3t + $\cos^2$(t).

(b) Draw the graphical form of decaying, raising and double exponential signals.

(c) What are the characteristics of filter?

(d) How to represent periodic signals by Fourier series?

(e) List out any two Fourier transformable pairs.

(f) Determine the DTFT of δ(n-2)+δ(n+2).

(g) Obtain the magnitude of frequency domain of unit step signal u(n).

(h) Mention the characteristics of distortion less transmission system.

(i) Differentiate Fourier, Laplace and z-Transforms.

(j) State the final value theorem of Laplace and z-transforms.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 (a) What is the concept of impulse function? Why the amplitude is infinity at origin? Explain.

(b) Examine the continuous time system y(t)=T{x(t)}=2x(t)+3 for linearity, time invariance, causality and stability.

OR

3 (a) Why the unit step signal u(t) is not even and not odd? Separate even and odd parts of u(t).

(b) Construct the convoluted signal x(t) = $x_1(t) \otimes x_2(t)$, where $x_1(t)$=u(t-1)-u(t-4) and $x_2(t)$=u(t-2)-u(t-3).

UNIT – II

4 (a) List out any three properties of continuous time trigonometric Fourier series.

(b) Analyze the representation of a signal by a set of mutually orthogonal sinusoidal signals.

OR

5 (a) What is the importance of discrete time Fourier series?

(b) How discrete time filters are described with differential equations? Explain with suitable example.

UNIT – III

6 (a) Compare Fourier transform with Fourier series.

(b) Obtain the time domain representation of $X(w) = \frac{jw}{(2+jw)^2}$

OR

7 (a) State and prove convolution property of Fourier transform.

(b) Find the Fourier transform of x(n)=n(n-1)u(n). Draw its magnitude spectrum.

UNIT – IV

8 (a) What is the importance of sampling theorem in communication? Explain.

(b) Analyze the effect of under sampling in communication.

OR

9 (a) Describe time and frequency domain aspects of non-ideal filters.

(b) Give one example for first order and second order discrete time systems. Obtain the relation between output and input.

UNIT – V

10 (a) List any three Laplace transformable pairs.

(b) Solve the difference equation y(n) - 2 y(n-1) = x(n) with x(n)= $(1/3)^n$ u(n).

OR

11 (a) Analyze the various constraints on ROC for various classes of discrete time signals.

(b) Get the Z-Transform of y(n)=3x(n)+2x(n-1) for x(n)= $3(1/2)^n$u(n)+ $2(1/3)^n$u(n).

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