

B.Tech. (ECE) 4th Semester F-Scheme

Examination, May-2019

SIGNALS & SYSTEMS

Paper-EE-228-F

Time allowed : 3 hours] [Maximum marks : 100

Note : Attempt five questions in total. All questions carry equal marks. Question No. 1 is compulsory. Attempt one question from each unit.

- 1. (a) Enumerate properties of a Delta function.
- (b) Explain the concept of negative frequency.
- (c) Discuss commutative property of LTI system.
- (d) Give out limitation of Fourier transforms.
- (e) Explain Bilateral LT. 5×4=20

Unit-I

- 2. (a) Explain the following signals with the help of suitable example : 10
  - (i) Energy and power signal.
  - (ii) Continuous time and discrete time signal.
- (b) Find the power and rms value of the signal given by : 10  
 $x(t) = P \operatorname{Cosec}(\omega t + \theta)$  Where as  $\theta = \theta \pi/2$

- 3. (a) Why Step, Ramp and Delta signal are called basic signal ? Elaborate and also establish relation between them. 10
- (b) What do you mean by transformation ? Explain how the independent variables "p" and "q" can be manipulated. 10

Unit-II

- 4. (a) Enumerate essential conditions for FT. Also give out Linearity and Duality property of Fourier Transform. 10
- (b) Determine the Fourier transform of the function given by : 10

$$x(t) = A \cos t e^{-b^2 t^2}$$

- 5. (a) Discuss existence of DFT. Also explain the convolution property of DTFT. 10
- (b) Find the output y(n) of a causal discrete time LTI system given by differential equation 10

$$Y(n) - \frac{1}{2}y(n-1) + \frac{1}{4}y(n-2) = 2x(n) \text{ for input}$$

$$x(n) = \left(\frac{1}{4}\right)^n u(n)$$

**Unit-III**

6. Give out properties of First Order Continuous Time System. Derive the equation to establish the inverse relationship between time and frequency. 20
7. (a) Give out the applications of Z transform in analysis of Discrete time LTI system. 10
- (b) Derive mathematical equation for a Distortion less transmission through LTI system. 10

**Unit-IV**

8. (a) Explain Inverse Laplace transform and give out its properties. 10
- (b) Evaluate the Laplace transform of  $x(t) = e^{2at} u(t)$  and plot the ROC. 10
9. (a) Give out the significance of ROC. 10
- (b) Obtain the Z- transform of discrete time signal  $x[n] = u[-n]$ . 10