Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.–4)

SIGNALS AND SYSTEMS

Subject Code : BTEC-403-18

M.Code : 77568

Date of Examination : 06-12-2023

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a) What is the simplest way to check the linearity of a system?

b) Differentiate between Fourier series and Fourier Transform.

c) Differentiate between even and odd signals.

d) Define causality and stability of LSI systems.

e) What is the significance of step and time domain response analysis?

f) State the time scaling property of Fourier transforms.

g) Define probability of random events.

h) Test the periodicity of $y(t)=\cos^2 t$.

i) Define the region of convergence of Z-transform.

j) What do you mean by aliasing?

SECTION-B

2. What is an LSI system? Explain its properties. Derive an expression for the transfer function of an LSI system.

3. Give the mathematical representation of random processes.

4. Distinguish between Fourier transform, Laplace transform and z transforms.

5. Find the impulse response of a stable LTI System characterized by the differential equation $\frac{dy(t)}{dt} + 2y(t) = x(t)$.

6. Find the Fourier Transform of $f(t) = t\cos(2t)$.

SECTION-C

7. a) Derive relationship between marginal and conditional probabilities.

   b) Find the Laplace Transform of the following :

      i) $te^{-at}u(t)$

      ii) $Cos\omega_o tu(t)$

8. a) Derive Parseval's relation for periodic signals.

   b) Determine the energy and power of the signal $s(t) = e^{-2t}u(t)$.

9. **Write a note on :**

   a) Sampling theorem

   b) Convolution property of Fourier Transform.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.