

Roll No.

Total No. of Pages : 02

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B.Tech. (Electronics & Communication Engineering)(PIT)(Sem.-4)

SIGNALS AND SYSTEMS

Subject Code :BTEC-403-18

M.Code :77568

Date of Examination : 09-07-22

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) Give the difference between periodic and aperiodic signal.
- b) Define continuous time unit step and unit impulse.
- c) What is meant by signal? Contrast the differences between energy and power signal.
- d) Find the Fourier transform of unit impulse $\delta(t)$.
- e) Differentiate between joint and conditional probabilities.
- f) Define probability density function.
- g) Distinguish between a continuous random variable and a discrete random variable.
- h) Define Fourier Transform. Write short notes on dirichlets conditions.
- i) Define probability of random events?
- j) Define sampling theorem

SECTION-B

2. When does aliasing occur? Explain the effects of aliasing.
3. Discuss properties of power spectral density function.
4. Find the input $x(n)$ of the system, if the impulse response $h(n)$ and the output $y(n)$ as shown below.

$$h(n) = \{1, 2, 3, 2\} \quad y(n) = \{1, 3, 7, 10\}$$

5. Find continuous time Fourier transform of the signal $s(t) = t \cos At$
6. Explain the reconstruction of the signal from its samples.

SECTION-C

7. a) State and prove time shifting and time scaling properties of Fourier Transform.
b) Find the Laplace transform of the signal $x(t) = e^{-at}u(t) + e^{-bt}u(-t)$
8. The input and output of a causal LTI system are related by the differential equation,

$$\frac{d^2y(t)}{dt^2} + 6\frac{dy(t)}{dt} + 8y(t) = 2x(t)$$

- i) Find the impulse response of the system.
- ii) What is the response of this system if $x(t) = te^{-2t}u(t)$
9. Write a note on:
 - a) Parseval's Theorem
 - b) Fourier Series.

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.