

Total No. of Questions : 09

P.T.U. Questions
B.Tech E
Sem

SIGNALS AND SYSTEMS

Subject Code : BTEC-403-18

M.Code : 77568

Date of Examination: 17-12-2024

Max. Marks : 60

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

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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:

- Define Step and impulse function in discrete Signals.
- What is the classification of systems?
- Check whether the discrete time signal $\sin 3n$ is periodic?
- What are the Conditions for a System to be LTI System?
- Define energy and power signals.
- Define odd and even signals.
- Find the Fourier transform of $x(t) = e^{i2\pi t}$
- Find the transfer function of an ideal differentiator.
- State Initial and Final value Theorem of Laplace Transforms.
- What is meant by impulse response of any system?

SECTION-B

2. Find the impulse response of the discrete time system described by the difference equation

$$y(n-2)-3y(n-1)+2y(n)=x(n-1).$$

3. Determine the DTFT of $(1/2)^n u(n)$. Plot its spectrum.
4. Define convolution Integral and describe its equation.
5. Using Laplace transform, find the impulse response of an LTI system described by the differential equation.

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

6. Find the Fourier transform of

$$x(t) = e^{-|t|} \text{ for } -1 \leq t \leq 1$$
$$= 0 \quad \text{otherwise}$$

SECTION-C

7. State and prove the time delay theorem and Parsavel's theorem of Z-transform.
8. Determine the Z transform of $x(n) = a^n \cos(\omega_0 n) u(n)$.
9. Discuss the block diagram representation for LTI discrete time systems.

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.