

Roll No.

OLE-3037

B. Tech. 3rd Semester (ECE)

Examination – April, 2021

SIGNALS & SYSTEMS

Paper : PCC-ECE-209-G

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is *compulsory*. Attempt any *four* selecting at least *one* question from each Unit. All questions carry equal marks.

1. (a) What do you mean by a Signal ? Define Different types of signals. 2.5

- (b) What is causal system ? Explain with examples. 2.5

- (c) What are the advantages of LTI System ? 2.5

- (d) Define cross correlation function of the power signals. 2.5

- (e) Give the Relationship b/w Laplace Transform and Fourier transform. 2.5
- (f) Define ROC for Z-Transform. 2.5

UNIT – I

2. (a) What is the Unit impulse function ? Explain the properties of continuous time Unit impulse function. 10
- (b) For A continuous time signal $x(t) = \delta(t + 2) - \delta(t - 2)$, calculate the value of E_y for the following signal $y(t) = \int_{-\infty}^t x(z) dz$. 5
3. Explain the following :
- (i) Linear and Non linear system. 5
- (ii) Time Scaling and Time Shifting properties of Discrete-Time System. 5
- (iii) Time Invariant System. 5

UNIT – II

4. (a) Explain the cascaded and Parallel connection of LTI System. 7.5
- (b) Discuss the Infinite Response of LTI System. 7.5

5. Explain the following :

- (i) Properties of Discrete-Time Fourier Transform. 7.5
- (ii) I/O and O/P Relationship for LTI System. 7.5

UNIT – III

6. Find the Inverse Laplace Transform of

$$X(s) = \frac{-3}{(s+2)(s-1)}. \quad 15$$

If ROC is :

- (a) $\text{Re}(s) > 1$
 - (b) $\text{Re}(s) < -2$
 - (c) $-2 < \text{Re}(s) < 1$
7. What do you mean by z-Transform ? Explain the various properties of z-Transform in details. 15

UNIT – IV

8. Write short notes on :

- (i) Solution of state Equation for Continuous Time System. 15
- (ii) State space Representation for Continuous Time LTI System.

9. Explain the following :

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- (i) State space representation of Discrete-Time LTI System.
 - (ii) Solution of state Equation for Discrete time LTI System.
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