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

If ROC is :

(a) R(s) > 1

(b) R(s) < –2

(c) –2 < R(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 : 15

(i) State space representation of Discrete-Time LTI System.

(ii) Solution of state Equation for Discrete time LTI System.