NAVRACHANA UNIVERSITY
a UGC recognized University

School: School of Engineering and Technology
Program/s: B.Tech-Electrical and Electronics Engineering
Year: 2nd **Semester:** 3rd
Examination: End Semester Examination
Examination year: December - 2021

Course Code: EE234 **Course Name:** **Signals and Systems**
Date: 06/12/2021 **Total Marks:** 40
Time: 08:30 am to 10:30 am **Total Pages:** 02

Instructions:

➔ *Write each answer on a new page.*
➔ *Use of a calculator is permitted/not permitted.*
➔ ** COs=Course Outcome mapping. # BTL=Bloom's Taxonomy Level mapping*

Q. No.	Details	Marks	COs*	BTL#
Q.1	A stable system has input x(t) and output y(t). Use Laplace transformation to determine transfer function and impulse response h(t) of the system. $$y(t) = -2e^{-t}u(t) + 3e^{-3t}u(t)$$ $$x(t) = e^{-2t}u(t)$$	6	CO4	BT1, BT2
Q.2	Draw output voltage waveform of full wave bridge rectifier. Obtain values of all Fourier coefficients. Find Fourier series for the full wave rectified sine wave. **OR** Draw output voltage waveform of half wave rectifier. Obtain values of all Fourier coefficients. Find Fourier series for the half wave rectified sine wave.	6	CO2	BT1, BT2, BT4
Q.3	Obtain Z-transform of the following, **(a)** $x(n) = (0.5)^n \{u(n)-u(n-10)\}$ **(b)** $x(n) = na^n u(n)$ **(c)** $x(n) = (1/2)^n u(n)$	6	CO4	BT1, BT2
Q.4	Obtain the Z-transform of the following finite duration sequences: $x(n) = \{1,2,4,5,0,7\}$. $\uparrow$	2	CO4	BT1, BT2

Q. No.	SECTION -II	Marks	COs*	BTL#
Q.1	Determine the response of the LTI system by graphical method whose input x[n] and impulse response h[n] are given by $$x[n] = \{2, 3, 0.5, 2\}$$ $$\uparrow$$ $$h[n] = \{2, 1, 3, -1\}$$ $$\uparrow$$	5	CO1	BT2, BT4

Q.2   a) Test the Linearity of the following system   5   CO1,CO3   BT2,
BT4
$$y[n] = \frac{1}{x[n-4]} + 5x[n]$$

c) Determine R_{xx} for the given sequence
$$x[n] = \{6, -4, 3, 0, 2, 1\}$$

Q.3   Find the 8 point DFT for the following sequence using Butterfly Structure   6   CO3   BT2,
BT4
$$x[n] = (3,4,1,2,3,1,2,3)$$

Q.4   a) Determine the even and odd parts of the signal $x[n] = \{2, -2, 6, -2\}$ 4   CO1   BT2,
BT4

b) Test the Causility of the following system
$$y[n] = x[n] + 2x[n+3]$$

************End of Question Paper************