Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

Make-up Examinations – December 2025

Date: 26 – 12- 2025 **Time:** 1.00pm to 04.00pm

School: SOE	**Program**: B.Tech	
Course Code : EEE2001	**Course Name :** Signals & Systems	
Semester: MK	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**
Marks	**8**	**22**	**48**	**22**

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

1	Recall the concept of non periodic signals	2 Marks	L1	CO1
2	What is the concept of Laplace transform	2 Marks	L1	CO3
3	Recall the concept of z transform?	2 Marks	L1	CO4
4	What sequence is followed for time based operation on signals	2 Marks	L1	CO1
5	List any 2 Properties of Laplace transform.	2 Marks	L1	CO3
6	Recall the concept of Energy signals	2 Marks	L1	CO1
7	Define initial value theoram	2 Marks	L1	CO3
8	Recall the concept of Final value theoram	2 Marks	L1	CO3
9	List any two dirichlet conditions	2 Marks	L1	CO2
10	Relate Ramp and unit step signal	2 Marks	L1	CO1

Part B

Answer the Questions **Total 80 Marks.**

11.	**a.**	A mathematician was plotting the Region of Convergence (ROC) of a given signal x(t). Region of Convergence (ROC) is defined as the set of points in s-plane for which the Laplace transform of a function x(t) converges. In other words, the range of Re(s) (i.e. σ) for which the function X(s) converges is called the region of convergence. The signal x(t) is an addition of two different signals and it was observed that the ROC is σ<-2 for one signal and σ>4 for the other signal. By referring to the above statements, outline the final equation of x(t) in terms of t and also comment on the stability of the signal. (Hint-The Signal x(t) is a combination of exponential one sided signals).	10 Marks	L2	CO3
	b.	Apply the concept of calculation of energy and power for rectangular signals and also apply laplace transform to that signal.	10 Marks	L3	CO3

or

12.	**a.**	A manufacturer has designed an inverter for integrating solar system to grid. The output waveform of an inverter circuit is a square wave of peak amplitude A. It is an even half wave symmetric signal. Summarize about the harmonics that would be present in this signal along with the formulas of fourier coefficients.	10 Marks	L2	CO3
	b.	Relate energy and power signal concept to Laplace transform. Explain with an example.	10 Marks	L2	CO3

13.	**a.**	Model electric circuit for explanation of the concept of impulse signal.	10 Marks	L2	CO2
	b.	The flux waveform in a transformer core is trapezoidal in nature whose equation is given by 3r(t)-3r(t-4)-3r(t-6)+3r(t-8)+3r(t-10). Here the time delay given in the question is in milliseconds. Show the rough diagram of the waveform.	10 Marks	L2	CO2

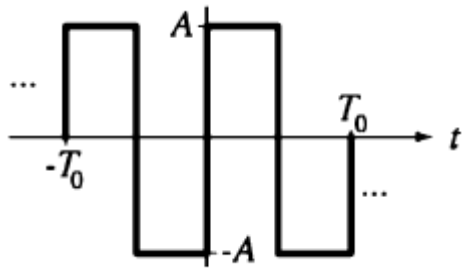
or

14.	**a.**	Model an electric circuit for explanation of the concept of time advance and time delay operations.	10 Marks	L1	CO2

	b.	Identify signum signal falls under the category of energy, power or NENP signal and compute the energy and power of any rectangular signal of your choice.	10 Marks	L1	CO2

15.	**a.**	Interpret the convolution of x(t)=u(t+2)-u(t-2) and h(t)=δ(t+2)-δ(t-2) by using properties of convolution.	10 Marks	L2	CO 3
	b.	Summarize the concept of Fourier series and its role in representing continuous-time periodic signals	10 Marks	L2	CO 3

Or

16.	**a.**	A manufacturer has designed an inverter. The output waveform of an inverter circuit is given below.  Summarize about the harmonics that would be present in this signal.	10 Marks	L2	CO 3
	b.	A DC voltage of 5 Volts was applied to an electrical circuit using a Battery comprising a Resistor, capacitor and a switch. All the elements are connected in series The value of Resistor is 1000 Ohms and capacitance is 3 micro-farads.The switched was initially open but at t=0 the switch has been closed and a transient response was observed. The battery was charging the capacitor to a steady state value. The voltage source in series with the switch gives rise to a type of Signal. After drawing the source signal, explain what will happen to the source signal if the switch is closed at t=to instead of t=0 with the help of conceptual explanations. Also compute the laplace transform of the signal.	10 Marks	L1	CO 3

17.	a.	A voltage having the Laplace transform (3s^2 + 2s + 1)/ (6s^2 + 4s + 3) is applied across a 2H inductor having zero initial current. It is desired to compute the current flowing through the inductor at steady state. Utilizing the Final value theorem solve for the current flowing through the inductor at steady state.	10 Marks	L3	CO 4

	b.	A Transfer function X(s)=N(s)/D(s) has a zero at -2 and 2 poles at 0 and -2. Solve for intial value and final value.	10 Marks	L3	CO 4

Or

18.	**a.**	Solve for the Z-Transform of the discrete-time signal x(n) = $a^n u(n)$ for n≥0 and also comment on the R.O.C.	10 Marks	L3	CO 4
	b.	With the help of the concept of sampling, explain the transition from Continuos time Fourier transform to Discrete time fourier transform and Discrete fourier transform.	10 Marks	L2	CO 4

******* BEST WISHES *******