Register Number:……..

KUMARAGURU
college of technology
character is life

B.E. DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Third Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U18ECT3101**:** Signals and Systems

COURSE OUTCOMES

CO1: Distinguish different types of signals and systems.
CO2: Analyze periodic signals using Fourier series.
CO3: Evaluate Continuous Time signals and system by using Fourier Transform.
CO4: Explain sampling of continuous time signals.
CO5: Analyze Discrete Time signals and systems by using DTFT and Z Transform.

Time: Three Hours **Maximum Marks: 100**

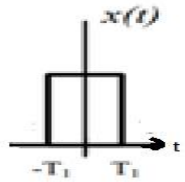
Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	Define Unit impulse signal.	CO1	[K_1]
2.	What is LTI system?	CO1	[K_1]
3.	Recall the synthesis and analysis equations of Fourier Series.	CO2	[K_1]
4.	Find the Discrete Time Fourier Series of x[n] =sin(ω_on).	CO2	[K_2]
5.	State the Dirichlet conditions for the convergence of Continuous Time Fourier Transform.	CO3	[K_1]
6.	Find the Continuous Time Fourier Transform of unit impulse signal.	CO3	[K_1]
7.	What is the Nyquist sampling frequency of a band limited signal x(t)=3cos(200πt).	CO4	[K_1]
8.	Define ROC in z transform.	CO5	[K_1]
9.	What is the z transform a^nu[n].	CO5	[K_1]
10.	Find the Inverse DTFT of $X(e^{jw}) = 1 + 3e^{-jw} + 7e^{-2jw}$	CO5	[K_1]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Define Convolution sum. Also state and prove its properties.	8	CO1	[K_1]
	b)	Check whether the following systems are LTI systems.	8	CO1	[K_3]

1. y(t) = |x(t)| 2. y[n] = cos(nπ + x[n])

12.	a)	State and prove the time shifting & frequency shifting properties of Continuous Time Fourier Series.	8	CO2	[K3]
	b)	Determine the Continuous Time Fourier Series of $x(t) = 10 + \cos(\omega_o t)$	8	CO2	[K3]
13.	a)	For the signal given below, determine the Continuous Time Fourier Transform. 	4	CO3	[K3]
	b)	Determine the Continuous Time Fourier Transform of the signal. $x(t) = e^{-a\|t\|}$, $a>0$.	12	CO3	[K3]
14.		State and prove the Sampling Theorem for band limited signal.	16	CO4	[K3]
15.	a)	Given $X(Z) = \frac{Z}{(Z-1)(Z-2)^2}$, $\{Z > 2\|$. Determine the inverse Z transform.	8	CO5	[K3]
	b)	Determine the frequency response of the given discrete system using Discrete Time Fourier Transform. y[n] = x[n] + (1/2) y[n-1].	8	CO5	[K3]
16.		Consider a LTI system described by the difference equation, $$y[n] - \frac{3}{4}y[n-1] + \frac{1}{8}y[n-2] = 2x[n]$$ Determine the frequency response and impulse response of the system.	16	CO2	[K3]

****