

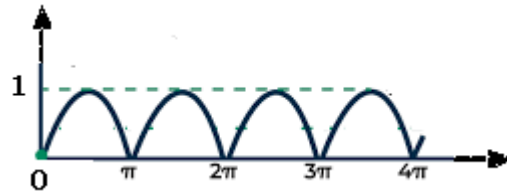
THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***Third Semester**Electronics and Communication Engineering***UCT24301- Signals and Systems***Regulations - 2024**Duration : 3 Hrs**Maximum : 100 Marks***PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

<i>Q.No</i>	<i>Questions</i>	<i>BTL</i>	<i>CO</i>	<i>Marks</i>
1.	Define unit step function for CT signal.	L1	1	2
2.	Check whether this signal is periodic or not $x(t) = \sin 2(t)$.	L2	1	2
3.	Obtain the Fourier Transform of unit step signal.	L2	2	2
4.	Find the Laplace transform of $\delta(t)$.	L2	2	2
5.	Obtain the system transfer function: $\frac{d^2 y(t)}{dt^2} + 4 \frac{dy(t)}{dt} + 3y(t) = \frac{dx(t)}{dt} + 2x(t)$	L2	3	2
6.	Differentiate between natural response and forced response.	L2	3	2
7.	Define Nyquist rate and Nyquist interval.	L1	4	2
8.	Determine the Z transform of $\delta(n)$.	L2	4	2
9.	Mention the basic elements are required to design the DT system in block diagram representation.	L2	5	2
10.	Determine the Convolution of $x(n) = \{2, -1, 3, 2\}$ & $h(n) = \{1, -1, 1, 1\}$.	L2	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Plot the graphical representation of the following signals: i. $u(-t + 2)$ ii. $x(n) = u(n) - u(n-3)$ iii. $3r(t - 1)$ iv. $\delta(t + 2)$	L2	1	16
	Or			
	b Find the even and odd components of this signal: i. $x(t) = \cos t + \sin t$ ii. $x(n) = \{-2, 1, 2, -1, 3\}$	L2	1	16

12. a Find Trigonometric Fourier Series for the following signal: L2 2 16



Or

- b i Find Fourier Transform $x(t) = t e^{-at} u(t)$. L2 2 8
- ii Find the Laplace Transform $x(t) = e^{-b|t|}$. L2 2 8

13. a Determine the impulse response of the CTS described by the differential equation: L4 3 16

$$\frac{d^2 y(t)}{dt^2} + 4 \frac{dy(t)}{dt} + 3y(t) = \frac{dx(t)}{dt} + 2x(t)$$

Or

- b Examine the Convolution of the given signal: $x(t) = e^{-3t} u(t)$ and $h(t) = u(t-1)$. L4 3 16
14. a i What do you mean by sampling? Explain the sampling operation in detail. L2 4 8
- ii Define aliasing and with an example explain how it can be eliminated. L2 4 8

Or

- b Find inverse z transform of $X(z) = \frac{1}{1 - 1.5z^{-1} + 0.5z^{-2}}$. L2 4 16
15. a Compute the linear convolution of $x[n] = \{1, 1, 0, 1, 1\}$ and $h[n] = \{1, -2, -3, -4\}$ using graphical method. L2 5 16

Or

- b Find out the output response of the system whose input and output are related by $y(n) = 7y(n-1) - 12y(n-2) + 2x(n) - x(n-2)$ for the input $x(n) = u(n)$. L2 5 16