R20 Regulation *Subject code:3B2AL*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech II Semester Supplementary Examinations, July 2025

TRANSFORM THEORY

(ECE)

Maximum Marks: 70 Date: 09.07.2025 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Write the first shifting theorem	2M	1	L1
2	Evaluate L (t sinat)	2M	1	L1
3	Find inverse Laplace transform of $\frac{3s+1}{(s+1)^2}$	2M	2	L1
4	State second shifting theorem in inverse Laplace transforms	2M	2	L1
5	If f (x) = x in (0,2∏) , then find a_0	2M	3	L1
6	If f(x) = x cosx, in (-∏,∏) then find b_1	2M	3	L1
7	If L(f(x))=F(s) then prove that $F(f(ax)) = \frac{1}{a}F(\frac{s}{a})$	2M	4	L1
8	Find the finite Fourier cosine transform of f(x) = sin ax in (0,π)	2M	4	L1
9	Find $z(a^n \sin n\theta)$	2M	5	L1
10	Evaluate $Z^{-1}[(\frac{z}{z-a})^2]$	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	a) Find Laplace transform of t^3e^{2t}sint. b) Evaluate L($\frac{1-cost}{t}$).	5M 5M	1	L2
	OR			
12	Find Laplace transform of square wave function with period 'a' given by, f(t) = 1: if 0<t<a/2 = -1 : if a/2< t < a.	10M	1	L2
13	Find $L^{-1}\left[\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right]$ using convolution theorem	10M	2	L2
	OR			
14	Solve the D.E $\frac{d^2x}{dt^2} - 4\frac{dx}{dt} - 12x = e^{3t}$ given that x(0)=1 and $x^1(0)= -2$ by using Laplace Transform.	10M	2	L2
15	The intensity of an alternating current after passing through rectifier is given by $i(x)=\begin{pmatrix} I_0 \sin X, & for\ 0\le X\le\pi \\ 0, & for\ \pi\le x\le 2\pi \end{pmatrix}$ where I_0 is the maximum current and the period is 2π express i(x) as a Fourier series.	10M	3	L2

	OR			
16	Express f(x)=x^2 as a Fourier series in[-l,l]	10M	3	L2
17	Find Fourier transform of $e^{-a\|x\|}$(a>0) and hence $\int_0^\infty \frac{\cos px}{a^2+p^2}dp=\frac{\pi}{2a}e^{-a\|x\|}$	10M	4	L2
	OR			
18	Find Fourier sine and cosine transform of $f(x)$=x$(\pi - x)$ in $(0,\pi)$.	10M	4	L2
19	Find $z^{-1}[\frac{z}{(z-a)}]^3$ using convolution theorem and deduce that $z^{-1}[\frac{z}{(z-1)}]^3=\frac{(n+1)(n+2)}{2}$	10M	5	L2
	OR			
20	Solve y_{n+2}- $7y_{n+1}$+$12y_n$ =0 with y_0=1,y_1=2 using z-transforms	10M	5	L2