R20 Regulation *Subject code:3B2AL*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B. Tech II Semester Supplementary Examinations, June 2026

TRANSFORM THEORY

(ECE)

Maximum Marks: 70 Date: 15.06.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 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	Find Laplace transform of $(t-2)^3u(t-2)$	2M	1	L1
2	Define Laplace transform of periodic function	2M	1	L1
3	Find $L^{-1}(\frac{3s-12}{s^2+8})$.	2M	2	L1
4	State second shifting theorem in inverse Laplace transforms.	2M	2	L1
5	If f (x) = x in $(0,2\pi)$, then find a_0	2M	3	L1
6	If f(x) = x cosx, in $(-\pi,\pi)$ then find b_1	2M	3	L1
7	Find $F_c(2e^{-5x}+5e^{-2x})$.	2M	4	L1
8	If F(f(x))=F(s) then prove that $F(f(x)\cos ax)) = \frac{1}{2}(F(s+a)+F(s-a))$	2M	4	L1
9	Find $z(n^p)$	2M	5	L1
10	If $z(u_n)$ =u(z) then prove that $z(a^n u_n) = u(\frac{z}{a})$	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	a) State and prove first shifting theorem in Laplace transforms b) Using Laplace transform evaluate, $\int_0^\infty \frac{\cos at-\cos bt}{t}\,dt$	5M 5M	1	L2
	OR			
12	a) State and prove change of scale property in Laplace transforms b) Find Laplace transform of $t^3e^{2t}\sin t$	5M 5M	1	L2
13	Find $L^{-1}\left[\frac{1}{s^2(s^2+1)(s^2+4)}\right]$	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	Obtain the half range Fourier Cosine series for $f(x) = xSinx$ in $(0,2\pi)$	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 the Fourier sine transform of f(x)= x: for 0<x<1 = 2-x : for 1<x<2 = 0 : for x>2	10M	4	L2
19	*a)* If $z(u_n)=\frac{2z^2+5z+14}{(z-1)^4}$ then find u_2 and u_3 b) Find $z^{-1}[\frac{2z^2+3z}{(z+2)(z-4)}]$	5M 5M	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