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 2024

Transform Theory

(ECE)

Maximum Marks: 70 Date:24.06.2024 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)		CO	Bloom Tx
1	Find Laplace transform of $(t-2)^3u(t-2)$	1	L1
2	Write the second shifting theorem in Laplace transforms	1	L1
3	Find inverse Laplace transform of $\frac{3s+1}{(s+1)^2}$	2	L1
4	State the inverse Laplace transform of derivatives	2	L1
5	If f(x) is to be expanded as a Fourier series in the interval $0 \le x \le 2\pi$ write formulae for a_0, a_n, b_n	3	L1
6	If $f(x) = x \cos x$, in $(-\pi, \pi)$ then find b_1	3	L1
7	Find the finite Fourier sine transform of $f(x) = \pi - x$ in $(0,\pi)$	4	L1
8	Find the finite Fourier cosine transform of $f(x) = \sin ax$ in $(0,\pi)$	4	L1
9	Find $z(a^n \sin n\theta)$	5	L1
10	Evaluate $Z^{-1}[(\frac{z}{z-a})^2]$	5	L1
	Part-B		
Answer All the following questions. (5X10M=50Marks)			
11	a) Find Laplace transform of $t^3e^{2t}\sin t$. (5M) b) Evaluate $L(\frac{1-\cos t}{t})$. (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 $L^{-1}\left[\frac{1}{s^2(s^2+1)(s^2+4)}\right]$ (10M)	2	L2
	OR		
14	Solve the D.E $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 12y = e^{3x}$ given that $y(0) = 0$ and $y'(0) = 0$ (10M)	2	L2
15	Obtain the half range Fourier Cosine series for $f(x) = x\sin x$ 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 sine and cosine transform of e^{-ax} and hence deduce the inverse formula (10M)	4	L2
	OR		
18	Show that Fourier transform of $e^{-\frac{x^2}{2}}$ is reciprocal (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