R20 Regulation *Subject code:* 3B2AL

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech II Semester Regular Examinations, September 2021

TRANSFORM THEORY

(ECE)

Maximum Marks: 70 Date:09.09.2021 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)**

1 *Find* $L\{\sin^2 t\}$

2 *Find* $L\{t^2 e^{-3t}\}$

3 *Find* $L^{-1}\left\{\frac{2s-3}{s^2-4}\right\}$

4 *Find* $L^{-1}\left\{\frac{1}{(s+4)^5}\right\}$

5 If f(x)= sinx is defined in $0 \le x \le 2\pi$
then find the value of fourier coefficient a_0

6 *Write any* two Dirichlet's conditions

7 *Write the* Linearity property of Fourier Transform

8 *Write* the formula for (i) $\int e^{ax} \sin bx \, dx$ (*ii*) $\int e^{ax} \cos bx \, dx$

9 *Find* $Z[u(n)]$ *where* $u(n)$ *is Unit step sequence*

10 *Find* $Z^{-1}\left\{\frac{z}{(z-5)(z+4)}\right\}$

Part-B

Answer All the following questions. **(5X10M=50Marks)**

11 (*a*) *Find* $L\{t^2 e^{3t} \sin 2t\}$ 5M

(*b*) *Find* $L\left[\frac{\cos 4t \sin 2t}{t}\right]$ 5M

OR

12 (*a*) *Find* L{ f(t)} where f(t) is a periodic function is given by 5M

$$f(t) = \begin{cases} \text{Sint}, & 0 < t < \pi \\ 0, & \pi < t < 2\pi \end{cases}$$

(*b*) *Find* $L\{e^{t-3} u(t-3)\}$ 5M

13 (a) *Find* $L^{-1}\left\{\frac{s+3}{s^2-10s+29}\right\}$ 5M

(b) *Find* $L^{-1}\left\{\frac{s^2+s-2}{s(s+3)(s-2)}\right\}$ 5M

OR

14 Solve the following differential equation using the Laplace transform 10M
$y^{11}-3y^{1}+2y=4t+e^{3t}$ *suchthat* $y(0)=1, y^{1}(0)=1$

15 Expand the function f(x)=xsinx as a Fourier series in the interval $-\pi \le x \le \pi$ 10M

OR

16 Find the half-range Cosine series for the function $f(x)= x^2$ *in* $0 \le x \le \pi$ 10M

17 *Find the Fourier transform of* $f(x)=\begin{cases}1 & \text{for } |x|<a \\ 0 & \text{for } |x|>a\end{cases}$

Hence evaluate $\int_0^{\infty}\frac{\sin ax}{x}$ 10M

OR

18 *Find* the finite Fourier sine and cosine transform of $f(x)=x(\pi-x)$ in $0<x<\pi$ 10M

19 (a) *Solve* $u_{n+1}+u_n=0$; $u_0=1$ *by* using Z transform 5M

(b) *Find* $Z\{(n-1)^2\}$ 5M

OR

20 *Find* $Z^{-1}\left\{\frac{z^2}{(z+4)(z+5)(3z+2)}\right\}$ 10M