



B. Tech II Semester Supplementary Examinations, January 2026

TRANSFORM THEORY (ECE)

Maximum Marks: 70

Date: 08.01.2026

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	Write the first shifting theorem.		2M	1	L1
2	Evaluate $L(t \sin at)$		2M	1	L1
3	Find inverse Laplace transform of $\frac{3s+1}{(s+1)^2}$		2M	2	L1
4	State the inverse Laplace transform of derivatives.		2M	2	L1
5	If $f(x) = x$ in $(0, 2\pi)$, then find a_0		2M	3	L1
6	If $f(x) = x \cos x$, in $(-\pi, \pi)$ then find b_1		2M	3	L1
7	Find $F_c(2e^{-5x} + 5e^{-2x})$.		2M	4	L1
8	Find the finite Fourier cosine transform of $f(x) = \sin ax$ in $(0, \pi)$		2M	4	L1
9	Find the z-transform of $\frac{1}{(n+1)!}$		2M	5	L1
10	Find $z(a^n + b^n)$		2M	5	L1

Part-B

Answer All the following questions.		(5X10M=50Marks)	Marks	CO	BTL
11	a) Find Laplace transform of $t^3 e^{2t} \sin t$. b) Evaluate $L\left(\frac{1-\cos t}{t}\right)$.		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 $\frac{d^2 y}{dx^2} - 4 \frac{dy}{dx} + 12y = e^{3x}$ given that $y(0) = 0$ and $y'(0) = 0$	10M	2	L2
15	The intensity of an alternating current after passing through rectifier is given by $i(x) = \begin{cases} I_0 \sin x, & \text{for } 0 \leq x \leq \pi \\ 0, & \text{for } \pi \leq x \leq 2\pi \end{cases}$ where I_0 is the maximum current and the period is 2π express $i(x)$ as a Fourier series.	10M	3	L2
OR				
16	Obtain half range Fourier Sine series for the function $f(x) = x(\pi - x); 0 < x < \pi$	10M	3	L2
17	Show that Fourier transform of $e^{-\frac{x^2}{2}}$ is reciprocal	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	5M	5	L2
	b) Find $z^{-1} \left[\frac{2z^2 + 3z}{(z+2)(z-4)} \right]$	5M		
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