

Roll No.																			
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



PRESIDENCY UNIVERSITY
BENGALURU

Mid - Term Examinations - March 2026	
Date: 12-03-2026	Time: 11.45am to 01.15pm

School: SOE	Program: B.Tech	
Course Code: MAT2302	Course Name: Transform Techniques Partial Differential Equations and Complex Variables	
Semester: II	Max Marks: 50	Weightage: 25%

CO - Levels	C01	C02	C03	C04	C05
Marks	24	26			

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

5Q x 2M=10M

1	Find the Laplace Transform of $\cos(2t + 3)$.	2 Marks	L3	C01
2	Define Convolution theorem in Laplace Transform	2 Marks	L1	C01
3	Find whether the function $f(x) = \frac{\pi-x}{2}$, is even or odd in $[0, 2\pi]$	2 Marks	L2	C02
4	Write the formula for Fourier Sine series over the interval $[0, \pi]$	2 Marks	L1	C02
5	Define Infinite Fourier transform of $f(x)$	2 Marks	L1	C02

Part B

Answer the Questions.

4Q x 10M=40M

6.	a.	Find the Laplace transform of $\sin 3t \cos 4t + \cos^3 3t$	5 Marks	L3	C01
	b.	Find the Laplace transform of $\frac{\cos at - \cos bt}{t}$	5 Marks	L3	C01

Or

7.		Find the Laplace transform of below function by expressing it in terms of unit step function $f(t) = \begin{cases} t^2 & 0 < t < 2 \\ 4t & 2 < t \leq 4 \\ 8 & t > 4 \end{cases}$	10 Marks	L3	C01
-----------	--	---	-----------------	-----------	------------

8.	a.	Find the inverse Laplace Transform of $\frac{s}{s^2+4s+5}$	5 Marks	L3	C01
	b.	Find the inverse Laplace Transform of $\log\left(\frac{s+2}{s-2}\right)$	5Marks	L3	C01
Or					
9.		Apply the concept of Laplace transform to solve the equation $\frac{dy^2}{dt^2} + 4\frac{dy}{dt} + 3y = e^{-t}$ with $y(0) = 0$ and $y'(0) = 0$	10 Marks	L3	C01

10.		Obtain the Fourier series expansion of $f(x) = x^2$ in $[-\pi, \pi]$	10 Marks	L3	C02														
Or																			
11.		Obtain Fourier series of $f(x)$ in $(0,6)$ up to second harmonic for the following data	10 Marks	L3	C02														
		<table border="1" style="margin-left: 40px;"> <tr> <td>x</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>f(x)</td> <td>9</td> <td>18</td> <td>24</td> <td>28</td> <td>26</td> <td>20</td> </tr> </table>	x	0	1	2	3	4	5	f(x)	9	18	24	28	26	20			
x	0	1	2	3	4	5													
f(x)	9	18	24	28	26	20													

12.		Find the Fourier transform $f(x) = \begin{cases} 1, & x < 1 \\ 0, & x > 1 \end{cases}$ and hence evaluate $\int_0^\infty \frac{\sin x}{x} dx$	10 Marks	L3	C02
Or					
13.		Find the Fourier sine transform of $f(x) = \begin{cases} 4x & \text{for } 0 < x < 1 \\ 4-x & \text{for } 1 < x < 4 \\ 0 & \text{for } x > 4 \end{cases}$	10 Marks	L3	C02