



VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

Pramod B
22BEE107B

Continuous Assessment Test II - May 2023

Programme : B.Tech.	Semester : Win 2022-23
Course : Differential Equations and Transforms	Code : BMAT102L
	Slot : D1+TD1+TDD1
Faculty : Dr. Radha, Dr. Nathiya, Dr. Harshavarthini, Dr. David Raj, Dr. Ashish Kumar, Dr. Saurabh chandra Maury, Dr. Manoj Kumar Singh, Dr. Prosenjit Paul, Dr. Abhishek Kumar Singh, Dr. Sandip Saha, Dr. Revathi, Dr. Vijay Kumar, Dr. Berin Greeni	Class ID : CH2022232300591, 594, 595, 622, 627, 629, 630, 628, 593, 631, 590, 634, 680, 592
Time : 90 Minutes	Max.Marks : 50

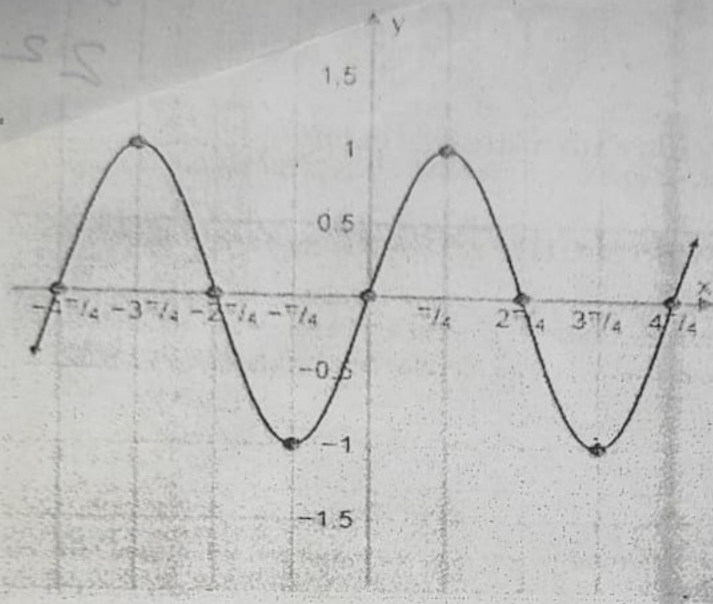
Answer ALL the questions

- (a) Find $L \left\{ \int_0^t \frac{e^{-t} \sin 2t}{2t} dt \right\}$ [5]

(b) Find $L^{-1} \left\{ \frac{e^{-2s}}{s^2 - 2s + 5} - \cot^{-1} s \right\}$. [5]
- (a) Find $L^{-1} \left\{ \frac{1}{(s^2 + 1)(s^2 + 4)} \right\}$ by using convolution theorem [5]

(b) Find the Fourier series representation of the periodic function $f(x) = x|x|$ over the interval $(-\pi, \pi)$. [5]
- Solve the following first order partial differential equation $\frac{\partial u(x,t)}{\partial x} + \frac{\partial u(x,t)}{\partial t} + 3u(x,t) = 0$ [10]

with initial and boundary conditions $u(0,t) = 0, t > 0$ and $u(x,0) = f(x)$ respectively where $f(x)$ is given by



4. Solve the following differential equation using Laplace transform

$$y'' - 10y' + 9y = \begin{cases} 5, & 0 \leq t \leq 2 \\ 0, & \text{otherwise;} \end{cases} \quad y(0) = 0 \text{ and } y'(0) = 0.$$

5. Obtain the Fourier series for the periodic function given in the graph

