



VIT

Vellore Institute of Technology
(Approved by AICTE under section 10 of UGC Act, 1956)

REG.NO.: 24BC10075

SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST - II
WINTER SEMESTER 2024-2025

SLOT: C1+TC1+TCC1

Programme Name & Branch : B.Tech
 Course Code and Course Name : BMAT102L- Differential Equations and Transforms
 Class Number(s) : Common question paper for this slot
 Date of Examination : 18-03-2025
 Exam Duration : 90 minutes Maximum Marks: 50

Answer All Questions

Q. No	Question	M	CO	BL
1.	a) Evaluate $\int_0^{\infty} e^{-2t} t u(t-1) dt$ using Laplace transform.	5	2	2
	b) Find the Laplace transform of a periodic function $f(t) = \begin{cases} 1 & \text{if } 0 < t < 1 \\ t & \text{if } 1 < t < 2 \end{cases}$ with period 2.	5	2	2
2.	Find the inverse Laplace transform of $\frac{1}{s(s^2 + 2s + 2)}$ using Convolution Theorem.	10	2	2
3.	Solve the equation $L \frac{d^2 q}{dt^2} + R \frac{dq}{dt} + \frac{q}{C} = 0$, where $L=1$ henry, $R=3$ ohms, $C=0.5$ farads. Find the charge q at any time t , given that $q(0) = 0$ and $q'(0) = 3$ using Laplace transform.	10	4	3
4.	Obtain the solution of $u_x + u_t + u = 0$ with $u(0, t) = 0$ ($t > 0$), $u(x, 0) = \cos x$ ($x > 0$) using Laplace transform	10	4	3
5.	Obtain the Fourier series of $f(x) = x^3 - \pi^2 x$ in the interval $(-\pi, \pi)$.	10	3	2
