



VIT

Vellore Institute of Technology

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

REG.NO.:

SLOT: A1+TA1+TAA1

Programme Name & Branch : B Tech
 Course Code and Course Name : BMAT102L-Differential Equations and Transforms
 Faculty Name(s) : Common
 Class Number(s) :
 Date of Examination : 27.01.2025
 Exam Duration : 90 minutes

Maximum Marks: 50

General instruction(s): Answer All Questions

Q. No	Question	M	CO	BL
1.	Solve $(D^2 - 3D + 2)y = \frac{1}{1 + e^{-x}}$; using the method of variation of parameters where $D: \frac{d}{dx}$	10	1	2
2.	Solve $y'' - 4y' - 12y = 3e^{5t}$ with $y(0) = \frac{18}{7}$, $y'(0) = -\frac{1}{7}$ using the method of undetermined coefficients.	10	1	2
3.	A circuit has in series and an electromotive force given by $\cos t$, resistor of 3 ohms, inductor of 1 henry and capacitor of 0.5 farads, if initial current and charge on capacitor is zero. Find the charge on capacitor at any time $t > 0$.	10	1	3
4.	(i) Find the partial differential equation of all spheres whose centres lie on the z-axis. (5M) (ii) Solve the partial differential equation $(x + 2z)p + (4zx - y)q = 2x^2 + y$, using Lagrange's method of multipliers. (5M)	10	2	2
5.	Solve the equation $3\frac{\partial u}{\partial x} + 2\frac{\partial u}{\partial y} = 0$; with $u(x, 0) = 4e^{-x}$ using method of separation of variables.	10	2	2
