



Continuous Assessment Test (CAT)-1 – January 2025

Programme	: B.Tech.	Semester	: Winter 2024-2025
Course Title	: Differential Equations and Transform	Code	: BMAT102L
Faculty	: B. Krishna Kumar Revathi G K N. Ramesh Babu Soumendu Roy Padmaja N Pulak Konar Rajivganthi C Abhishek Kumar Singh Dhivya M Berin Greeni A Poulomi De	Slot	: D1+TD1+TDD1
		Class Nbr.	: CH2024250500860 CH2024250500861 CH2024250500863 CH2024250500864 CH2024250500865 CH2024250500866 CH2024250500867 CH2024250500868 CH2024250500869 CH2024250500870 CH2024250500871
Duration	: 1 ½ Hours	Max. Marks	: 50

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information.
- Only non-programmable calculator without storage is permitted.

Course Outcomes:

- CO1-Find solution for second and higher order differential equations, formation and solving partial differential equations

Answer all the Questions (5 x 10 = 50 marks)

Q. No.	Question Description	Marks	CO	BL
1.	Using the method of variation of parameter, solve $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} = e^x \sin x$.	10	CO1	K3
2.	Solve the following differential equation: $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = \sin(\ln(x^2))$.	10	CO1	K3
3.	(a) A mass weighing 8 pound stretches a spring 2 ft. Assume that a damping force numerically equal to 2 times the instantaneous velocity acts on the system. If the mass is initially released from the equilibrium position with an upward velocity of 3 ft/s, determine the equation of motion.	05	CO1	K4
	(b) Construct the PDE by eliminating the arbitrary function f from $z = e^{ax+by}f(ax-by)$.	05		
4.	(a) Find the singular integral of the PDE $z = px + qy + p^2 - q^2$.	04	CO1	K5
	(b) Solve: $\left(\frac{p}{2} + x\right)^2 + \left(\frac{q}{2} + y\right)^2 = 1$.	06		
5.	Solve $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$.	10	CO1	K3