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Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science and Engineering
Midterm Examination, Fall 2024
Course Code: MAT211, Course Title: Engineering Mathematics
Level: L2 Term: T1 Batch: 65

Time: 01:30 Hrs **Marks: 25**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	*a)*	**Explain** the conditions of the linear ODE with examples.	[2]	CO1
	b)	**Demonstrate** the ODE of the following equation $xy = e^{2x}\left(A\sin x + B\cos x\right)$.	[3]	
	c)	**Show** the solution of the ODE $y - x\frac{dy}{dx} = a\left(y^2 + \frac{dy}{dx}\right)$ is $y = C(x+a)(1-ay)$.	[5]	
2.	*a)*	Solve the non-linear (Bernoulli's) ODE $y\frac{dy}{dx} - y^2 = xe^{3x}$.	[5]	CO2
	b)	Solve the first order first degree homogeneous ODE $xdy - \sqrt{x^2+y^2}\,dx = ydx$.	[5]	
3.	*a)*	**Solve** the higher order ODE $D^3y - 2Dy + 4y = e^x \sin x$.	[5]	CO2

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