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Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science and Engineering
Midterm Examination, Summer 2026
Course Code: MAT211, Course Title: Engineering Mathematics
Level: L2 Term: T1 Batch: 69

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.***	Show that the ordinary differential equation (ODE) of a straight line is $\frac{d^2y}{dx^2} = 0$.	[2]	**CO1**
	b.	Demonstrate the ordinary differential equation of a family of curves $y = x^2(Acos4x + Bsin4x)$	[4]	
2.	***a.***	The packet loss rate L(t) due to buffer overflow can be modeled as: $\frac{dL}{dt} = \gamma(B - L)$. Where, B = buffer capacity (2000 packets), γ = rate of loss increase (0.06 per sec) and initial loss rate L(0)=100. Identify the loss rate after 25 seconds.	[5]	**CO2**
	b.	Solve the first order first degree homogeneous ODE $y^2 + 3x^2\frac{dy}{dx} = xy\frac{dy}{dx}$	[4]	
	c.	Solve the non-linear ODE $\frac{dy}{dx} + \frac{y}{x} = y^2$ by converting it into linear differential equation.	[4]	
3.		Solve the higher order ODE $D^3y - 6D^2y + 12Dy - 8y = e^{2x} + sinx$	[6]	**CO2**

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