



Daffodil International University
Faculty of Science & Information Technology
Department of Computer Science and Engineering
Final Examination, Summer 2025
Course Code: MAT211, Course Title: Engineering Mathematics
Level: 1 Term: 3 Batch: 67

Time: 2:00 Hrs

Marks: 40 .

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)	Solve the following higher order ODE: $x^2 \frac{d^2 y}{dx^2} + x \frac{dy}{dx} - 4y = x^2 \cos(\ln x)$.	[5]	CO2
	b)	Solve the following higher order ODE: $\frac{d^3 y}{dx^3} - 6 \frac{d^2 y}{dx^2} + 11 \frac{dy}{dx} - 6y = 10 + e^{3x}$.	[5]	
2.	a)	Test for the proof of the following equation: $\mathcal{L}\{e^{at}\} = \frac{1}{s-a}$.	[2]	CO3
	b)	Simplify the following expression: a) $\mathcal{L}\{19 + 2e^{3t} - t^{3/2}\}$, b) $\mathcal{L}\{6e^{-5t} t \sin^2 3t\}$.	[3+5]	
3.	a)	Apply the Convolution theorem to calculate the expression: $\mathcal{L}^{-1}\left\{\frac{30}{s^3 - 2s^2 + 9s - 18}\right\}$.	[5]	CO4
	b)	Apply the Laplace transformation technique to solve the following higher order ODE: $Y''(t) + 4Y(t) = \cos 3t, Y(0) = 1, Y'(0) = \frac{12}{5}$.	[5]	
4.	a)	Construct the Finite Fourier Sine and Cosine transformation of the following function: $F(x) = e^{2x}, 0 < x < \pi$.	[5]	CO4
	b)	Develop the Half-Range Fourier Cosine series of the given function: $F(x) = x; 0 < x < 4$.	[5]	