



Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science and Engineering
Final Examination, Fall 2024

Course Code: MAT211, Course Title: Engineering Mathematics

Level: 2 Term: 1 Batch: 65

Time: 2 Hours

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 ODE $x^3 \frac{d^3 y}{dx^3} + 3x^2 \frac{d^2 y}{dx^2} + x \frac{dy}{dx} - y = x$.	[5]	CO2
	b)	Solve the ODE $x^2 \frac{d^2 y}{dx^2} + 4x \frac{dy}{dx} + 2y = \sin(\ln x^2)$.	[5]	
2.	a)	Simplify the function $\mathcal{Z}\{e^{-t}(t^3 - 3\sin^2 t)\}$.	[5]	CO3
	b)	Simplify the function $\mathcal{Z}\{t^2 \cos 2t\}$.	[5]	
3.	a)	Examine $\mathcal{Z}^{-1}\left\{\frac{e^{-3s}}{s^2 + 4s - 12}\right\}$.	[5]	CO3
	b)	Examine $\mathcal{Z}^{-1}\left\{\frac{2s}{s^2 - 6s + 13}\right\}$.	[5]	
4.	a)	Solve $Y''(t) - Y(t) = \cos t$, $Y(0) = Y'(0) = 0$.	[5]	CO4
	b)	Develop the Fourier series of the given function $F(x) = x^3$, $-\pi < x < \pi$.	[5]	