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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 $x^3\frac{d^3y}{dx^3}+3x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}-y=x$.	[5]	CO2
	b)	Solve the ODE $x^2\frac{d^2y}{dx^2}+4x\frac{dy}{dx}+2y=\sin\left(\ln x^2\right)$.	[5]	
2.	*a)*	Simplify the function $\mathcal{L}\left\{e^{-t}\left(t^3-3\sin^2 t\right)\right\}$.	[5]	CO3
	b)	Simplify the function $\mathcal{L}\left\{t^2\cos 2t\right\}$.	[5]	
3.	*a)*	Examine $\mathcal{L}^{-1}\left\{\frac{e^{-3s}}{s^2+4s-12}\right\}$.	[5]	CO3
	b)	Examine $\mathcal{L}^{-1}\left\{\frac{2s}{s^2-6s+13}\right\}$.	[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]	

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