



Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Final Examination, Fall-2023

Course Code: MAT101, Course Title: Mathematics I

Level: 1 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)	Find the partial fractions of the following rational fraction $\frac{2x - 3}{(x + 4)(x^2 + 7)}$	6	CO2
	b)	Find the partial fractions of the following improper fraction $\frac{2x^3 - 3x - 7}{x^2 + 4x - 5}$	4	
2.	a)	Identify the maximum and the minimum value of the function $f(x) = 2x^3 - 15x^2 + 36x + 10$	6	CO3
	b)	Solve the derivative $\frac{d}{dx}(\sin^{-1}(e^{\cot^{-1}x}))$	4	
3.	a)	Solve the following integrals (i) $\int x^2 \sin 3x \, dx$ (ii) $\int \frac{e^x(1+x)}{\cos^2(xe^x)} \, dx$ (iii) $\int_0^{\frac{\pi}{2}} \frac{dx}{1+\cot x}$	5 4 4	CO4
	b)	Identify the area of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ by using integration. Then deduce the area if $a^2 = 25$ and $b^2 = 4$.	7	