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Daffodil International University

Faculty of Science & Information Technology

Department of Computing & Information System (CIS)

Final Examination, Fall-2024

Course Code: MAT101, Course Title: Mathematics I

Level: 1 Term: 1 Batch: 20

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.] 5, 3, 7.

1.	***a)***	Find the decomposition of the following rational fraction into the partial fraction $\frac{4+7x}{(2+3x)(1+x)^2}$	**4**	**CO2**
	b)	Find the partial fraction of the following improper fraction $\frac{x^3+4x-9}{x^2+x-2}$	**6**	
2.		Identify the maximum and the minimum value of the function $f(x) = 4x^3 + 19x^2 - 14x + 3$	**5**	**CO3**
3.	***a)***	Simplify the following integrals i) $\int Cos^3 x dx$ ii) $\int \frac{Sinx+Cosx}{\sqrt{1+Sin2x}} dx$	**5** **5**	**CO4**
	b)	Evaluate the following integral $\int_0^{\pi/2} \frac{\sqrt{tanx}}{1+\sqrt{tanx}} dx$	**5**	
4.	***a)***	Test the nature of the equation $2x^2 - 3xy + y^2 - 5x + 4y + 6 = 0$.	**5**	
	b)	Find the angle between the lines represented by the equation $3x^2 + 5xy + 2y^2 = 0$	**5**	