



**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. 5, 3, 7.  
 All portions of each question must be answered sequentially.]*

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) $\int \frac{\sin x + \cos x}{\sqrt{1 + \sin 2x}} dx$	5 5	CO4
	b)	Evaluate the following integral $\int_0^{\pi/2} \frac{\sqrt{\tan x}}{1 + \sqrt{\tan x}} dx$	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	