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Daffodil International University

Faculty of Science & Information Technology

Final Examination, spring 2023

Course Code: MAT101, Course Title: Mathematics-I

Level: L1 Term: T1 Batch: 64

Time: 2:00 Hrs **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)	Evaluate : $\int e^{4x} Sin5x \; dx$	[5]	CO4
	b)	Evaluate: $\int_0^{\sqrt{7}} \frac{dx}{(7+x^2)^{\frac{3}{2}}}$	[5]	
2.	a)	Solve the integral $\int \frac{2x^3+x^2-x-3}{x(x-1)(2x+3)} dx$	[5]	CO3
	b)	Resolve the function into Partial fraction : $\frac{(3x^2-x+1)}{(x+1)(x^2-x+3)}$	[5]	
3.	a)	If $\phi(x,y,z) = 3x^5y - 15y^3z^7$, Determine $\nabla\phi$ and div grad ϕ ($\nabla \cdot \nabla\phi$) at the point (1, -2,-1).	[5]	CO4
	b)	If $A=xz^3i - 2x^2yzj + 2yz^4k$, then Determine $\nabla \times (\nabla \times A)$ *or* (*Curl curl A*)	[5]	
4.	a)	Determine the value of $\frac{dy}{dx}$ if $y = \frac{1+tanx}{1+cosx} + a^x \cos^{-1} x$	[5]	CO4
	b)	Determine $\frac{dy}{dx}$ if $(\tan x)^y = (cosy)^x$	[5]	

$$\int uv = u\int v\,dx - \int \left(\frac{du}{dx}\cdot \int v\,dx\right) dx$$