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261-35-018

Daffodil International University

Faculty of Science & Information Technology
Department of Software Engineering
Final Examination, Summer 2026
Course Code: MAT101; Course Title: Mathematics I
Batch: 47; Section: A-H; Teachers Initial: MMH, SST, AMS

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.	**Explain** the following terms: **a.** Geometrical Concept of Critical Point. **b.** Geometrical Concept of Integration.	$2 \times 2 = 4$	
2.	**a. Compute** the maximum/minimum value of the following function $f(x) = \frac{\log x}{x}$ **b.** A garden is to be laid out in a rectangular area and protected by a chicken wire fence. **Compute** is the largest possible area of the garden if only **100** running feet of chicken wire is available for the fence. **c. Compute** the critical points of the following function. Identify the intervals on which y is increasing and decreasing, concave up and concave down. Also find the inflection points, if any, of the above function. $y = 3x^4 + 4x^3 - 12x^2 - 2$	3 $4 \times 2 = 8$	CLO-1 L-2
3.	**Calculate** the followings: **a.** $\int sin^4x\ dx$ **b.** $\int_1^e \frac{(x+1)(\ln x+x)^3}{x}\ dx$ **c.** $\int_0^{1-x}\int_0^{2-x} xy\ dx\ dy$ **d.** $\int_0^{\pi} x\ sin^6x\ cos^4x\ dx$ **e.** $\int \frac{\tan x}{\sec x+\tan x}\ dx$	$3 \times 5 = 15$	CLO-2 L-3
4.	**a. Identify** the area of the circle $x^2 + y^2 = 25$. **b. Identify** the area enclosed between the circle $x^2 + y^2 = 8x$ and the curve $y = 2\sqrt{x}$.	5 5	CLO-3 L-4