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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
.	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

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