



Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Midterm Examination, Spring 2026

Course Code: MAT102 , Course Title: Mathematics II

Level: 1 Term: 2 Batch: 70

Time: 01:30 Hrs

Marks: 25

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)	Illustrate Gamma function to calculate, $\int_0^{\infty} e^{-5x} x^{\frac{9}{2}} dx$	[02]	CO1
	b)	Illustrate Gamma - Beta function to calculate I. $\int_0^{\frac{\pi}{2}} 8 \sec^{0.5} x \operatorname{cosec}^{-0.5} x dx$ II. $\int_0^1 \sqrt{x^3} \left(\frac{1}{\sqrt[3]{1-x}} - 1 \right)^5 dx$	[02] [04]	
2.	a)	Apply the Euler's theorem to identify the value $x \frac{\partial G}{\partial x} + y \frac{\partial G}{\partial y} + z \frac{\partial G}{\partial z}$ of the following function $G(x, y, z) = \tan^{-1} \frac{x + y + z}{\sqrt{x} - \sqrt{y} + \sqrt{z}}$	[05]	CO2
	b)	Construct the matrix form of the complex number $Z = 6.3Z_1 - Z_2 + Z_3$ Where $Z_1 = (4.9, 231^\circ)$, $Z_2 = 5e^{2.3i}$, and $Z_3 = (-8 + 3i)^5$	[07]	
3.		Mr. Karim covers a region R where $R = \{f(x, y, z) \mid 1 \leq x \leq e, 1 \leq y \leq e, 1 \leq z \leq e, \}$ and $f(x, y, z) = (xyz)^{-1}$. Examine the volume of that region.	[05]	CO3