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. $\int_0^{\frac{\pi}{2}} 8\, sec^{0.5}x\, cosec^{-0.5}x\, dx$ II. $\int_0^1 \sqrt{x^3}\left(\frac{1}{\sqrt[3]{\frac{1}{x}}} - 1\right)^5 dx$	[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 $R = \{f(x, y, z) \mid 1 \le x \le e, 1 \le y \le e, 1 \le z \le e, \}$ and $f(x, y, z) = (xyz)^{-1}$. **Examine** the volume of that region.	[05]	CO3