



Daffodil International University

Department of Software Engineering
Faculty of Science & Information Technology
Final Examination, Spring-2025

Course Code: MAT 102; Course Title: Mathematics II

Sections: A-Q & Teachers: MMH, MIA, NA, MNM

Marks: 40

Time: 2:00 Hrs

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.	i. Explain Modulus & Argument geometrically. ii. Describe the Analytic function with example. iii. Extend the idea of the Harmonic function with example. iv. Describe the nature of a of Fourier series if the function is even.	4 × 2 = 8	CLO-1 Level-2
2. a)	Determine z^3 by applying the De Moivre's theorem and, plot it in the complex plane along with z , where z is: $z = i^4 + \sqrt{3}i^3$	4+1=5	CLO-2 Level-3
b)	Calculate the Fourier series of the following function: $F(x) = x^2 \cos(nx)$, $-\pi \leq x \leq \pi$	5	
3. a)	Examine whether the following function u is harmonic or not; if it is harmonic, then Construct the conjugate harmonic function v . Complete the complex variable $f(z) = u + iv$ $u(x, y) = 2x + 12xy - x^3 + 3xy^2 + p$	3+4+1=8	CLO-3 Level-3
b)	Determine whether the following function $f(z)$ is analytic or not; if it is analytic, then Calculate $f'(z)$ $f(z) = e^{z^4}$; $z = x + iy$	4	
4. a)	Identify the Fourier cosine transform of the following function: $F(x) = \sin(kx)$, $0 < x < \pi$	4	
b)	The following diagram describes the traffic flow of a congested area of a city on some day. Construct the system of linear equations from this scenario. Then, Identify the solution of the system for the unknown flow rates.	6	CLO-4 Level-4