



Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Mid Examination, Spring 2025

Course Code: MAT101, Course Title: Mathematics-I

Level: L1 Term: T1 Batch: 68

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.]

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|----|----|--|---|-----|
| 1. | a) | Demonstrate the prime factorization of 3600 using the tree diagram. Also, find all factors and sum of the composite factors. | 3 | CO1 |
| | b) | Three bells ring at interval of 12 minutes, 21 minutes, and 28 minutes respectively. If they all ring together at 11:00 AM, find the time when they will ring together? | 2 | |
| 2. | a) | If $7^x + 7^{1-x} = 8$ then find the value of x. | 2 | CO1 |
| | b) | Demonstrate the solution of the inequality $\frac{x^2 + 12x + 35}{x^2 - 6x + 9} \leq 0$ using sign table. | 3 | |
| 3. | a) | Apply the Remainder Theorem for solving the following polynomial equation $x^6 + 12x^5 + 46x^4 + 52x^3 - 15x^2 = 0$ | 5 | CO2 |
| 4. | a) | If $y = \sin^{-1}(e^{\ln(\sin x)})$ and $z = x^{x^x}$ then examine the rate of change of z with respect to y or $\frac{dz}{dy}$. | 5 | CO3 |
| | b) | Examine the rate of change of y with respect to x or $\frac{dy}{dx}$ of the function $y = \tan^{-1} \sqrt{\frac{1-x}{1+x}} + \tan^{-1} \left(\frac{\cos x}{1 + \sin x} \right)$ | 5 | |