# 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, 21minutes, 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 $\frac{x^2+12x+35}{x^2-6x+9} \le 0$ 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 $y = \sin^{-1}\left(e^{\ln(\sin x)}\right)$ 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 | |