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Daffodil International University

Department of Computer Science and Engineering
Faculty of Science & Information Technology
Midterm Examination, Fall-2023
Course Code: MAT101, Course Title: Mathematics I
Level: L1 Term: T1 Batch: 65

Time: 1 Hour and 30 Minutes **Marks: 25**

Answer ALL the Questions
[The figures in the right margin indicate the full marks and corresponding course outcomes. All the portions of each question must be answered sequentially]

1.	a) Show the number 1040 as the product of its prime factors in exponential form. List down all of its composite factors in ascending order. b) Three alarm clock rings at an interval of 16, 24 and 72. All three bell rang at 6:00 am. Utilize the LCM method to determine when the three balls will ring together next.	3 2	CO1
2.	a) Construct the solution of inequality $8 - 2x - x^2 > 0$ in the interval notation using sign diagram. b) Find the value of y from the equation $\frac{7^{9y-1}}{(49)^{3y}} = \frac{(343)^{2+y}}{(49)^{3-y}}$.	3 2	CO1
3.	What is the root of a polynomial? Solve the equation $3x^3 + x^2 - 12x - 4 = 0$ utilizing remainder theorem.	5	CO2
4.	a) Determine $\frac{dy}{dx}$ for the function (i) $y = (sinx)^{\tan^{-1}x}$ (ii) $y = \ln\left(x + \sqrt{8 + x^2}\right)$ b) A biker is riding a bike on a hilly road where the equation of the path is $y = 3^x x^2 \sin^{-1} x$. Estimate the slope of the path at point $x = 0.5$.	3 2 5	CO3