



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.]

1.	a)	Demonstrate the prime factorization of 3600 using the <u>tree diagram</u> . Also, find all factors and <u>sum of the composite factors</u> .	3	CO1
	b)	Three bells ring at interval of 12 minutes, <u>21 minutes</u> , and <u>28 minutes</u> respectively. If they all ring together at <u>11:00 AM</u> , 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. <u>$[-7, -5]$</u>	<u>3</u>	
3.	a)	Apply the Remainder Theorem for solving the following polynomial equation $x^6 + 12x^5 + 46x^4 + 52x^3 - 15x^2 = 0$ <u>$(x^2(x^4+12x^3+46x^2+52x-15))$</u>	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	

$$f(x) = \frac{(x+7)(x+5)}{(x-3)(x-3)}$$

$$\ln = 1 \left(\frac{1-x}{1+x} \right)^{\frac{1}{2}} = \sqrt{\frac{1-x}{1+x}}$$