



# Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Final Semester Examination, Spring 2025

Course Code: CSE223, Course Title: Digital Logic Design

Level: 2 Term: 2 Batch: 65

Time: 2:00 Hrs

Marks: 40

## Answer ALL Questions [Optional]

*[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)	The priority levels of four inputs of a 4 to 2 priority encoder are given by $w_2 > w_3 > w_1 > w_0$ . Using truth table and logic equations design the logic Circuit for priority encoder.	5	CO3
	b)	Implement the Boolean function $F(x_1, x_2, x_3, x_4) = \sum (0, 2, 5, 7, 8, 10, 13, 15)$ with a Multiplexer. Assume $x_1, x_3$ and $x_4$ are connected with selection lines.	5	
2.	a)	For the following input draw the output waveforms Q & Q' for a D flip-flop. Consider, Initially the flip-flop is in reset state.  <div style="text-align: center;"> </div>	5	CO4
	b)	Design a 4-bit serial in the parallel-out shift register.	5	
3.	a)	Define synchronous and asynchronous counters. Design a three-bit up/down counter using T flip-flops. It should include a control input called UP /Down. If UP /Down = 0, then the circuit should behave as an up counter. If UP /Down = 1 then the circuit should behave as a down-counter.	5	CO4
	b)	Create a comparison table that highlights the key differences and applications between RAM and ROM, considering their characteristics, advantages, and limitations.	5	
	c)	A smart home system is designed to automatically control the room Light and Fan. The system should activate the lights and fan based on the following conditions: Condition 1: $\text{Light}(A, B, C) = \sum m(0, 1, 2, 4)$ Condition 2: $\text{Fan}(A, B, C) = \sum m(0, 5, 6, 7)$ Construct the PLA implementation for the Lights and Fan functions.	10	