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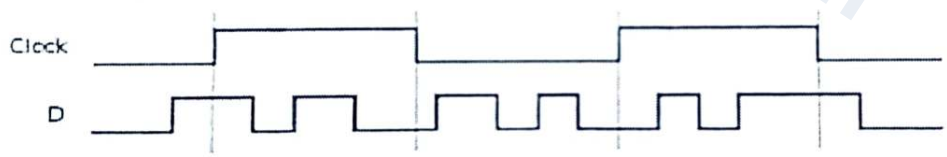
Daffodil International University

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 w2 > w3 > w1> w0. 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) = Σ (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. 	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: Light(A, B, C) = $\sum$**m(0, 1, 2, 4)** Condition 2: Fan(A, B, C) = $\sum$ **m(0, 5, 6, 7)** Construct the PLA implementation for the Lights and Fan functions.	10	