



Daffodil International University

Department of Software Engineering
Faculty of Science & Information Technology

Final Examination, Spring 2026

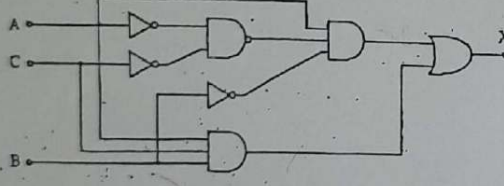
Course Code: SE 213; Course Title: Digital Electronics & Logic design
Sections & Teachers: 45: NIR (A-D), SP (G-J), NJN (E, F, K, L), RRB (M)

Time: 2:00 Hrs.

Marks: 40

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)	Compute the reserve canonical form for following Boolean expression and simplify it using the K-map (consider minterms to construct k map): $F(w,x,y,z) = (w+x+y+z')(w+x+y'+z')(w+x'+y+z')(w'+x+y'+z')$	[Marks-6]	CLO-2 L3
	(b)	Interconvert the Boolean expression from the following Logic Circuit and simply the expression. 	[Marks-4]	
2.	(a)	An Adder within a digital ALU is used to compute the sum of two binary numbers 01110 and 11011. By constructing the Adder diagram, perform a bit-wise addition and provide the Sum (S) and Carry-out for every bit position.	[Marks-5]	CLO-3 L3
	(b)	Draw and configure an Octal to Binary code converter circuit applying the concept of encoder/decoder. Draw the Circuit diagram, truth table and derive the output expressions.	[Marks-5]	
	(c)	Demonstrate the following Boolean function using an appropriate multiplexer. Show all steps including Implementation table and final design. $F(A, B, C, D) = \Sigma(0, 1, 3, 6, 11, 12, 14)$	[Marks-5]	
3.	(a)	Suppose You are operating an SR Latch NAND currently in the SET state ($S=1, R=0$). Identify the next specific input values for S and R required to transition the circuit into a state to maintain the current output. Explain your answer using the SR latch's NAND characteristic logic.	[Marks-3]	CLO-4 L4

	(b) The SR flip-flop suffers from an invalid state when both inputs are low. Identify the specific flip-flop designed to mitigate this issue by using feedback to enable a toggle function instead. Along with the circuit diagram, explain how this new flip-flop modifies the internal logic to ensure a predictable output even when both inputs are active. 	[Marks- 5]	
	(c) i) In 5-bit shift register: 10011, illustrate how many clock pulses are required to change the content of shift register when all 1's (using by XOR gate for last two bit), ii) Draw and describe the block diagram of Serial Input Parallel Output (SIPO) Register	[Marks- 3+4]	