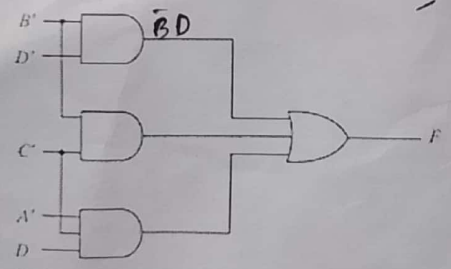
Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Mid Semester Examination, Fall-2024
Course Code: CSE223, Course Title: Digital Logic Design
Level: 2 Term: 2 Batch: 64

Time: 1.5 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)	Show the types of digital number system and show the conversion of following numbers: 1. $(85203.416)_9 = (?)_7$ 2. $(42673.271)_{10} = (?)_4$	4	CO1
	b)	Demonstrate the following Boolean function using only NOR gates **F(A,B,C,D) = (AB′C) + (A′D) + (BC′)**	4	
2.	a)	Construct a simplified expression of the following Boolean expression using simplification law. **F(A,B,C) = (ABC′) + (A′(B+C) (B′+C′)) (A+BC)**	4	CO2
	b)	Illustrate the Boolean expression of the following circuit and develop its standard form using sum of minterms (SOP). 	4	
	c)	Apply the simplification of the following Boolean function using K-map with sum of minterm: F(A,B,C,D) = Σ(0, 1, 3, 4, 5, 12,15) + Σ d(2, 8, 10,11)	4	
3.	a)	You are assigned to develop a fire alarm system in a building that operates based on the following sensors: • **S**: 1 if smoke is detected, 0 otherwise. • **T**: 1 if high temperature is detected, 0 otherwise. • **M**: 1 if the manual alarm is activated, 0 otherwise. The fire alarm (F) should be activated under these conditions: 1. **F=1** when smoke is detected and high temperature is detected. 2. **F=1** when smoke is detected and the manual alarm is activated. 3. **F=1** when high temperature is detected or the manual alarm is activated. **Now,** Construct the truth table for F, derive the Boolean expression and draw the logic circuit diagram.	5	CO3