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Midterm Examination, Fall2021 @ DIU Blended Learning Center

Course Code: CSE223 (Day), Course Title: Digital Electronics

Level: 2 Term: 2 Section: All

Instructor: All Modality: Open Book Exam

Date: Tuesday 14 November, 2021 Time: 01:30-04:00pm

Two and half hours (2:30), Marks: 25

Answer all questions

1. You have to add two BCD number "1001" and "0101" using a Binary adder. So, design the whole structure for adding these two number. For making the block diagram more informative draw the necessary circuit diagram in every block. **5**

2. For making your home smart, recently you proposed a system. Your plan is to setup a camera, a motion sensor, a temperature sensor and a dark sensor into your house. Now, you want to control all outputs using a circuit. In that case, you want to get an "ALARM" if motion sensor find any object and a positive output from camera. In addition, you want to turn on "Front Light" after getting output from dark sensor and expect an "SMS" in your cell phone if motion and temperature sensor provide active output at a time. So, propose the circuit diagram with truth table where Boolean expression is needed to implement the whole system. **10**

3. a) Convert the following Boolean Function into Standard Forms. **5**

$$F(A, B, C, D) = \overline{(A + B)}\,C + \overline{(B + C)}\,\overline{D}$$

b) Simplify the following Boolean expression after that you will have to draw a logic circuit for the simplified function using only 7 NAND gates. You allow to use any forms of a variable as an input: **5**

$$F(M, N, O, P) = \Sigma\,(1, 2, 4, 9, 14, 15) + \Sigma\,d\,(1, 3, 6, 7, 12, 13)$$