Manarat International University (MIU)

Department of Computer Science and Engineering (Evening)

Midterm Examination (Summer 2017)

Course Code: CSE-209 Course Title: Digital Logic Design

Full Marks: 20 Time: 1 Hour 30 Minutes

Answer any 5 (five) question. All questions are of equal value.

1. Define the following terms [1 X 4 = 4]

   a. Power Dissipation
   b. Propagation Delay
   c. Priority Encoder
   d. Noise Margin

2. a. Implement $\mathbf{F(A, B, C) = A + B'C}$ as a sum of minterms. [2 X 2 = 4]
   b. Convert $\mathbf{F(X, Y, Z) = X + X'Y'}$ as a product of maxterms.

3. Simplify the following expressions using Boolean algebra. [2 X 2 = 4]

   a. $\mathbf{AB + A(CD + CD')}$
   b. $\mathbf{(BC' + A'D)\ (AB' + CD')}$

4. Implement the following Boolean function together with the don't-care conditions d, using no more than three NOR gates: [4]

$$\mathbf{F(A,B,C,D) = \Sigma\ (0,1,9,11)}$$

$$\mathbf{d(A,B,C,D) = \Sigma\ (2,8,10,14,15)}$$

5. Design a Decimal-to-BCD encoder. Write down the truth table and draw the circuit diagram. [4]

6. Derive the circuits for a three-bit parity generator and four-bit parity checker using odd parity bit. [2 X 2 = 4]