International Islamic University Chittagong (IIUC)

Dept. of Electronic and Telecommunications Engineering

Final Examination, Autumn 2018

Course Code: ETE 2323 Course Title: Digital Electronic & Logic Design

Full Marks: 50 Time: 2.5 Hours

[Part- A]

[Answer any two of the following questions]

1. a) Interpret how Karnaugh map is simple straightforward procedure for minimizing Boolean functions? Build up Karnaugh maps for 5 variables Boolean functions. 3+3

   b) Using K-map method, simplify the Boolean function 4
   $F(A,B,C,D) = \sum(2,3,4,5,6,7,9,10,12,13,14,15)$

2. a) Differentiate between Half Adder and Full Adder Circuit. Formulate the logical expressions output Sum and Carry for a full Adder circuit. 2+4

   b) Using the block diagram method, implement the following function using only NAND gates. 4
   $F = AB + CD + E$

3. a) Write down the necessity of parity generator and checker logic circuit during the transmission of binary information. 4

   b) Design a combinational circuit to generate and check for even parity of three bits binary message code. 6

[Part- B]

[Answer any three of the following questions]

4. a) Discuss a technique (principle of look-ahead carry) with suitable example which minimizes the carry propagation delay in the binary parallel adder circuit. 4

   b) Design a Decimal Adder by using two 4 bit Full Adder Circuits. 6

5. a) Differentiate between Decoder and Encoder Circuit. 4

   b) Design a full adder circuit by using Decoder and OR gates. 6

6. a) Implement the following function with a multiplexer, $Y(A, B, C, D) = \Sigma(1,2,3,6,8,11,13,14)$ consider the variable A in the multiplexer input and B, C, D to the selection lines of an 8×1 *MUX*. 5

b) Design a combinational circuit using a ROM. The circuit accepts a 3-bit binary number and generates an output binary number equal to the square of input. 5

7. a) What is counter? Using D-type flip flop, design a 2 bit binary counter using sequence 0,1,2,3 and repeat. 4

b) Show the logic diagram and characteristic table for JK flip-flop. Determine it's characteristic equation. 6