International Islamic University Chittagong (IIUC)

Dept. of Electronic and Telecommunications Engineering

Final Examination

Program: B.Sc (Engg.)
Course Code: ETE 2323
Semester: Spring, 2018
Course Title: Digital Electronic & Logic Design
Full Marks: 50
Time: 2.5 Hours

[Part- A]

[Answer any two of the following questions]

1. a) Explain how Karnaugh map is simple straightforward procedure for minimizing Boolean functions? Simplify the following Boolean function by using K-map- 2+4

   i) $f(w,x,y,z)=\sum(2,3,4,5,6,7,9,12,13,14,15)$

   ii) $f(x,y,z)=\sum(0,1,2,3,4,5,6)$

   b) Using K-map method, simplify the Boolean function 4

   $F(w,x,y,z) = \sum(0,2,3,5,6,7,8,9)$

   $d(\text{don't care})(w,x,y,z) = \sum(10,11,12,13,14,15)$

2. a) What do you understand by combinational logic circuit? Explain. 3

   b) Describe half adder and full adder with necessary figures, tables and equations. 7

3. a) Explain what is the necessity of parity bit scheme during transmission of binary information. 4

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

[Part- B]

[Answer any three of the following questions]

4. a) Define binary parallel adder. Design a BCD to Excess-3 code converter using binary parallel adder. 4

   b) Discuss a technique (principle of look-ahead carry) with suitable example which minimizes the carry propagation delay in the binary parallel adder circuit. 6

5. a) Define magnitude comparator and write only the logical expressions for A=B, A>B and A<B, when $A=A_3A_2A_1A_0$ and $B=B_3B_2B_1B_0$. 2+3

   b) Design a full adder circuit by using two multiplexers. 5

6. a) Design a combinational circuit using a ROM. The circuit accepts a 2-bit binary number and generates an output binary number equal to the square of input. 5

b) A combinational circuit is defined by the functions: 5

$F_1 = A\overline{B} + AC$

$F_2 = AC + BC$

Implement the circuit with PLA.

7. a) What do you understand by counter? Show an example. 3

b) Design a counter using the binary sequence: 0,4,2,1,6 and repeat. Use T flip-flops. 7