K 243

B.E/B.TECH DEGREE EXAMINATIONS NOV/DEC 2010

THIRD SEMESTER

ELECTRONICS AND COMMUNICATION ENGINEERING

EC1203—DIGITAL ELECTRONICS

(Common to Mechanical Engineering)

(REGULATIONS 2007)

Time : Three hours Maximum : 100 marks

Answer all the questions

Part – A (10 x 2 = 20)

1. What is the major difference between ECL and TTL?
2. What is enhancement mode operation of MOS?
3. How will you build a full adder using two half adders and an OR gate?
4. Draw the block diagram of a two bit parallel adder.
5. Obtain 8x1 MUX using dual 4x1 MUX.
6. How many address lines are required for a 4K ROM?.
7. Distinguish Mealy and Moore machines.
8. What is the basic difference between a Johnson counter and a ring counter?
9. Compare fundamental and pulse mode asynchronous sequential circuit.
10. Define races in asynchronous sequential circuit.

Part – B (5 x 16 = 80)

11. a. Draw and explain the circuit diagram of a TTL NAND gate with totem-pole and open collector output. (1

Or

b. (i) With neat diagram explain RTL NOR gate. Also discuss about the characteristics of RTL family. (8

(ii) Draw the basic CMOS inverter and explain its operation. (8

12. a. i. Design a magnitude comparator such that it compares two 2-bit numbers A and B (8)

ii. Design a full adder circuit using basic gates. (8)

Or

b. Design a BCD adder using full-adders and explain its operation. (1

13. a. Design a logic circuit to convert the Gray code to binary code. (1

Or

b. i. Using 8x1 multiplexer realize the following Boolean function $F(w,x,y,z)=\Sigma(0,1,2,4,5,7,8,9,12,13)$ (8)

ii. Implement the following two Boolean functions with a PLA (8)

$F(A,B,C) = \Sigma(0,1,2,4)$

$F(A,B,C) = \Sigma(0,5,6,7)$

14. a. Design a 4-bit self correcting ring counter using D flip-flop. (16)

Or

b. Design a synchronous MOD-16 counter using J-K flip-flops. (16)

15. a. i. What is meant by hazard? Discuss the types of hazards. (6)

ii. With suitable example explain how static, dynamic and essential hazards can be eliminated. (10)

Or

b. Design an asynchronous sequential circuit with two inputs X_1 and X_2 and one output Z. Initially both inputs are equal to zero. When X_1 or X_2 becomes '1' and output Z becomes 1. When the second input also becomes 1, the output changes to 0.The output stays at 0 until the circuit goes back to the initial state. (16)