FACULTY OF ENGINEERING

B.E. 2/4 (CSE) I – Semester (Main) Examination, December 2013

Subject: Logic and Switching Theory

Time: 3 Hours   **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1.   Convert the decimal number 59 to binary, octal and hexadecimal number system.   (2)

2.   Draw the logic diagram and functional table of universal gates.   (3)

3.   List the Huntington postulates.   (2)

4.   Convert the Boolean function $F(x,y,z) = xy + y z'$ into canonical SOP form.   (3)

5.   Define implicant, prime implicant, essential prime implicant.   (2)

6.   Draw the functional diagram for 3-to-8 line decoder.   (3)

7.   Write the properties of symmetric functions.   (3)

8.   Draw the JK – flipflop and write the characteristic table and excitation table.   (3)

9.   Realize Half-Adder using basic gates.   (2)

10. Draw the state-diagram of 3-bit binary counter.   (2)

PART – B (50 Marks)

11.(a) Express the Boolean function $F = xy + x'z$ in a product of maxterm and minterm
       form.   (4)

   (b) Simplify the Boolean function $F(w, x, y, z) = \Sigma(0, 1, 2, 4, 5, 6, 8, 9, 12, 13, 14)$.   (6)

12. Simplify the following Boolean function by using tabulation method.   (10)
     $$F = \Sigma(0, 1, 2, 8, 10, 11, 14, 15)$$

13. Design a combination circuit that generated the 9's complement of a BCD-digit.   (10)

14. Design a synchronous mod-10 counter using D-flipflop.   (10)

15. Determine whether the following function is symmetric. Identify its number and

     variables of symmetry.   (10)

     $$f(w, x, y) = \Sigma(0, 2, 4, 5, 6, 7)$$

16.(a) Simplify the Boolean function using Boolean theorems $F(x, y, z) = \Sigma(3, 4, 6, 7)$.   (5)

   (b) Realize basic gates using NOR-gate.   (5)

17. Write short notes on the following:

     (a) Adders   (5)

     (b) Encoder and priority encoder.   (5)

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