Code No. 4211/N

FACULTY OF ENGINEERING

B.E. 2/4 (CSE) I Semester Suppl. Examination

May/June - 2008

Subject : Logic and Switching Theory

Time : 3 hours] [Max. Marks : 75

Note : Answer ***all*** questions of Part-A.

Answer ***five*** questions from Part-B.

PART - A (25 marks)

1. NOR gate is called a universal gate. Justify the statement with an example. 2
2. Convert the hexadecimal number ABC 9 into its decimal and octal equivalents. 2
3. What is the advantage of Karnaugh map approach to simplification of boolean expressions over the algebraic approach ? 3
4. Design and draw a circuit for odd parity generation for an eight bit data. 3
5. Distinguish between a decoder and demultiplexa. 2
6. Draw the circuit diagram of a binary full adder after designing the logic circuit with logic gates. 3
7. Write the excitation table of J-K flip-flop. Derive a D type flip-flop using J-K flip-flops. 3
8. Write a VHDL code for a 2:4 decoda. 2
9. What is a hazard ? Give the example of a combinational circuit with a hazard. 3
10. Explain how a function can be symmetric with a suitable example. 2

PART - B (5×10=50 marks)

11. (a) Given that $C = A\bar{B} + \bar{A}B$; show that $A = B\bar{C} + \bar{B}C$.

(b) Prove that the sum of all minterms of a 3 variable Boolean functions is equal to 1

(c) Determine the canonical sum form for

$f(A, B, C) = C + (\bar{A} + B)(A + \bar{B})$ 3+4+3

12. Design a full adder circuit using look ahead carry generator. 10

13. (a) Design a 5 × 32 decoder using only 3 × 8 decoder modules. Assume that each 3 × 8 decoder has one active low enable input and one active high input.

(b) Draw the circuit diagram and explain the functioning of 3 × 8 multiplexer.

14. Design a sequential synchronous counters that follows the sequence 0, 2, 4, 7, 5, 1. Use JK flip-flops and NAND gates to realize the counter. 10

15. (a) Determine whether the following function is symmetric:

$f(x, y, z) = \Sigma(0, 2, 3, 4, 5, 7)$

If so, find the variables of symmetry.

(b) Find the contact realization for the following function :

$f(P, Q, R, S) = \Sigma(3, 7, 8, 9, 13)$.

How many springs are likely to be used ? 5+5

16. Simplify the following function using tabular method.

$f(A, B, C, D, E, F, G) = \Sigma(20, 28, 38, 39, 52, 60, 102, 103, 127)$. 10

17. Write short notes on : 4+3+3

(a) Symmetric relay contact networks

(b) Essential prime implicant

(c) Multilevel logic design.
