

Prelim Paper

Time: 3 Hrs.]

Digital Logic Design and Analysis

[Marks : 80

- N.B.:**
- (1) Question number 1 is compulsory.
 - (2) Attempt any three questions out of remaining five.
 - (3) Each question carries 20 marks and sub-question carry equal marks.
 - (4) Assume suitable data if required.

1. Solve following :

- (a) Convert $(1762.46)_{10}$ into octal, binary and hexadecimal. [3]
- (b) Prove OR-AND configuration is equivalent to NOR-NOR configuration. [3]
- (c) Perform following subtraction $(52)_{10} - (65)_{10}$ using 2's complement method. [3]
- (d) Explain the term prime implicant. [2]
- (e) Construct Hamming code for 1010. [3]
- (f) Find 8's complement of the numbers $(37)_8$ and $(301)_8$ [3]
- (g) Add $(22)_{10}$ to $(56)_{10}$ in BCD. [3]

2. (a) Obtain the minimal expression using Quine Mc-Cluskey method [10]

$$F(A,B,C,D) = \sum m(1,5,6,12,13,14) + d(2,4)$$

(b) Simplify the following equation using K map to obtain SOP equation and realize the minimum equation using only NAND gates. [10]

$$F(A, B,C,D) = \sum m(1,2,4,6,9,10,12,14) + d(3,7,13)$$

3. (a) Implement a full adder using 8:1 multiplexer. [10]

(b) What is race around condition? How to overcome it? [10]

4. (a) Compare TTL and CMOS logic with respect to fan in, fan out, propagation delay, power consumption, noise margin, current and voltage parameters. [10]

(b) Design 3 bit asynchronous counter and draw the timing diagram. [10]

5. (a) Convert JK flip flop to SR flip flop and D flip flop. [10]

(b) Explain the features of VHDL and its modeling styles. [10]

6. Write short notes on following (any FOUR) : [20]

- (a) State table
- (b) Sequence Generator
- (c) 4-bit ring counter
- (d) Moore and Mealy machine
- (e) Priority encoder

