

Time: 3 Hours

Marks: 80

- N.B. (1) Question No. 1 is compulsory
 (2) Assume suitable data if necessary
 (3) Attempt any three questions from remaining questions

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- (a) Convert $(47.3)_7$ to BCD, Excess-3 and gray code. (3)
 (b) Perform $(2F9)_H - (1AD)_H$ without converting to any other base. (3)
 (c) Subtract $(64)_{10} - (31)_{10}$ using 2's complement. (4)
 (d) Explain race around condition. (4)
 (e) Prove OR-AND configuration is equivalent to NOR-NOR configuration. (4)
 (f) Obtain hamming code for data 1101. (2)

- 2 (a) Simplify following function using Quine McCluskey method and realize circuit using basic gates. (10)

$$F(A,B,C,D) = \sum m (0,1,3,5,7,9,11,15) + d(2,14)$$

- (b) Design 1-bit magnitude comparator. (10)

- 3 (a) Compare different logic families with respect to fan in, fan out, speed, propagation delay and power dissipation. (5)

- (b) Simplify $Y = \bar{A}\bar{B}\bar{C} + A\bar{B}\bar{C} + A\bar{B}C$ (5)

- (c) Implement the following using only one 8:1 Mux and few gates. (10)

$$F(A,B,C,D) = \sum m (0, 1, 5, 7, 9,10,15)$$

- 4 (a) Convert D flip-flop to JK flip-flop and JK flip-flop to D flip-flop. (10)

- (b) Design a full adder using only NAND gates. (10)

- 5 (a) Design mod -6 asynchronous UP counter. (10)

- (b) Write short note on VHDL. (10)

- 6 (a) Explain Astable and Bistable multivibrators. (10)

- (b) Explain 4-bit bidirectional shift register. (10)