

Time: 3hour

Max. Marks: 80

N.B. (1) Question No. 1 is compulsory

(2) Assume suitable data if necessary

(3) Attempt any three questions from remaining questions

Q1 Attempt **any four**

- a. Given the two binary numbers $x=1010100$ and $y=1000011$ perform the subtraction $x-y$, using 2's complement. (5)
- b. Develop Hamming code for message bits 1111. (5)
- c. Design Full Adder using logic gates. (5)
- d. Compare TTL and CMOS logic families. (5)
- e. Write short note on VHDL. (5)

- Q2
- a. Explain Race around condition. (5)
 - b. Convert JK f/f into D f/f. (5)
 - c. Simplify using Quine Mc Clusky method
 $F(ABCD) = \sum m(0,1,2,5,7,8,9,10,13,15)$. (10)

- Q3
- a. Design 3 bit synchronous down counter using suitable flip-flops. (10)
 - b. Design 1digit BCD adder using IC 7483. (10)

- Q4
- a. Solve using K map and implement using NAND gates only
 $F(ABCD) = \sum m(1,2,3,8,9,10,11,14) + d(7,15)$. (10)
 - b. Explain 4 bit bidirectional shift register. (10)

- Q5
- a. Write Short note on Priority Encoder. (5)
 - b. State and prove De Morgan's theorem. (5)
 - c. Design 3bit binary to gray code converter. (10)

- Q6
- a. Write short note on 4 bit universal shift register (10)
 - b. Design 3 bit Asynchronous counter. (10)
