

Time : 3 Hours

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

- Given the two binary numbers $x=1010100$ and $y=1000011$ perform the subtraction $x-y$, using 2's complement. (5)
- Add $(57)_{10}$ and $(26)_{10}$ in BCD. (5)
- Design Full Adder using logic gates. (5)
- Compare TTL and CMOS logic families. (5)
- Prove NAND as a universal gate. (5)

Q2 a. Explain the uses of grey code. (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 4-bit BCD adder (10)

Q4 a. Solve using K map and implement using NAND gates only

$$F(ABCD) = \sum m(1,2,3,8,9,10,11,14) + d(7,15). \quad (10)$$

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 a 2-bit magnitude comparator. (10)

Q6 a. Compare synchronous and asynchronous counters. (5)

b. Implement full adder using 3 to 8 decoder and NAND gates. (5)

c. Explain Master Slave JK flip flop in detail. (10)
