

B.E. (Information Technology) Third Semester (C.B.S.)  
**Digital Electronics & Fundamentals of Microprocessor**

P. Pages : 2

Time : Three Hours



NRT/KS/19/3330

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
  2. Solve Question 1 OR Questions No. 2.
  3. Solve Question 3 OR Questions No. 4.
  4. Solve Question 5 OR Questions No. 6.
  5. Solve Question 7 OR Questions No. 8.
  6. Solve Question 9 OR Questions No. 10.
  7. Solve Question 11 OR Questions No. 12.
  8. Assume suitable data whenever necessary.

1. a) Perform the following operations. 8
- i)  $(101100110.11)_2 \rightarrow ( )_{10}$       ii)  $(1001101)_G \rightarrow ( )_2$
- iii)  $(3287.51)_{10} \rightarrow ( )_8$       iv)  $(2A3.AB)_H = ( )_8$

- b) State and prove De-Morgan's theorem. 6

**OR**

2. a) Prove the following : 6
- i)  $\bar{A}BC + A\bar{B}C + AB = AB + BC + AC$
- ii)  $A + \bar{A}B + A\bar{B} = A + B$

- b) Realise all the basic gates using NAND gates as well as NOR gates. 8

3. a) Minimize the following logic function using k-map and realize the circuit using NOR gates only. 7
- $f(A, B, C, D) = \pi M(1, 4, 6, 9, 10, 11, 14)$

- b) Expand the following equations to get standard SOP form 6
- i)  $f(a, b, c) = ab + a\bar{c} + \bar{b}\bar{c}$
- ii)  $f(a, b, c, d) = (\bar{a} + bc)(b + \bar{c}d)$

**OR**

4. a) Simplify the following functions using k-map : 8
- i)  $f(A, B, C, D) = \sum m(1, 3, 5, 8, 9, 10, 11, 15) + d(2)$
- ii)  $f(A, B, C, D) = \pi M(1, 4, 6, 9, 10, 11, 14, 15)$

- b) What do you mean by minterms and maxterms ? Express the following function in form of minterms as well as maxterms. 5
- $Y = \bar{A}\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}\bar{D} + \bar{A}B\bar{C}\bar{D} + ABCD + \bar{A}BCD + A\bar{B}C\bar{D}$

5. a) Design and explain 2 bit priority encoder. 7

- b) Realise the following functions using 3:8 decoder and suitable gates. 6
- i)  $f_1(a, b, c) = \sum m(3, 5, 6, 7)$
- ii)  $f_2(a, b, c) = \sum m(1, 2, 5, 6)$

**OR**

6. a) Implement the following function using 8:1 MUX connect inputs B, C, D to select lines. 6  
 $F(A, B, C, D) = \sum m(0, 2, 3, 7, 8, 9, 12, 13, 15)$
- b) Design a BCD to Excess - 3 code converter. 7
7. a) What is race around condition in JK flip flop ? State the ways in which it can be eliminated. 5
- b) Differentiate between synchronous and asynchronous counters. 4
- c) Explain different types of triggering methods of flip flop. 4

**OR**

8. a) Design a synchronous decade counter using T flip flop. 7
- b) Convert the following flip flops 6
- i) JK flip flop to SR flip flop
- ii) T flip flop to D flip flop
9. a) Draw and explain the architecture of 8085 microprocessor. 10
- b) Explain the following pins of 8085 microprocessor. 4
- i) ALE ii) SID
- iii) TRAP iv) READY

**OR**

10. a) Explain the following instructions : 8
- i) XTHL ii) DAA
- iii) LXI H, address iv) PUSH B
- b) What are addressing modes ? Explain the various addressing modes of 8085 microprocessor with suitable examples. 6
11. a) Draw and explain the interrupt structure of 8085 microprocessor in detail. 7
- b) Write a program to transfer 15 bytes of data from memory location 2000H to memory location 3000H. 6

**OR**

12. a) Write a program to find the smallest element in a block of 8 byte of data. 7
- b) Explain RIM and SIM instructions of 8085 microprocessor. 6

\*\*\*\*\*