B.E. Third Semester (Information Technology) (C.B.S.)

Digital Electronic & Fundamentals of Microprocessor

P. Pages : 2 **NKT/KS/17/7245**

Time : Three Hours * 0 2 9 3 * 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.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Discuss the advantages of Digital system over the analog system. **6**

b) What is Gate. Explain the basic gates with its truth table. **7**

OR

2. a) Explain and prove the De-Morgan's Theorem. **5**

b) Convert the following. **8**

i) $(1E)_H \rightarrow (q)_2 \rightarrow (\ )_0$

ii) $(101100110.11)_2 \rightarrow (\ )_d$

iii) $(38.13)_{10} \rightarrow (\ )_{BCD}$

iv) $(1001101)_G \rightarrow (\ )_2$

3. a) Express the following function in standard SOP form. **6**

i) $f(ABCD) = (\overline{A} + BC)(B + \overline{C}D)$

ii) $f(PQRS)(P)\ (QRS + \overline{P}Q)(RS + \overline{P}\,\overline{Q})$

b) Simplify the given function using k-map and Implement using logic gates. **8**

i) $f(ABCD) = \Sigma m(0,1,4,5,6,8,9,12) + d(13,14)$

ii) $f(ABCD) = \Sigma m(3,4,6) + d(1,2,5)$

OR

4. a) Design a k-map for the function and express function in standard SOP form **6**

$f = AB + A\overline{C} + C + AD + A\overline{B}C + ABC$

b) Simplify using k-map and Implement using logic gates. **8**

$f(ABCDE) = \pi M(0,2,5,7,8,10,16,21,23,24) + d(27,29,31)$

5. a) Design the 2 bit priority encoder and implement it. **7**

b) Implement the following function using 4 : 1 multiplexer. **6**
$f(A, B, C) = \Sigma m(0,2,3,5)$.

OR

6. a) Design 1 : 32 demultiplexer using 1 : 8 demux. **6**

b) Design how a full adder is implement from two half adders and one OR gate. Draw the logic circuit and give its truth table. **7**

7. a) Convert the following Flip-Flop : **8**
i) S-R to J-K Flip-flop.
ii) J-K flip flop to D flip-flop.

b) Draw and explain the 4-bit Ripple counter with waveforms. **6**

OR

8. a) Explain the working of JK flip flop. What is race around condition and how it is eliminated. **7**

b) Design lock free counter to count in the following sequence. **7**

$$\begin{array}{ccccc} 2 & \rightarrow & 7 & \rightarrow & 1 \\ \uparrow & & & & \downarrow \\ 6 & \leftarrow & 4 & \leftarrow & 5 \end{array}$$

9. a) Draw and explain the architecture of $\mu p8085$. **8**

b) Explain the following pins in $\mu p8085$ **5**
i) Ready
ii) Hold
iii) Trap
iv) Reset
v) SID

OR

10. a) Explain addressing modes in $\mu p8085$ with one example each. **6**

b) Give the format of flag Register in $\mu p8085$. Explain each flag. Also discuss the application of Auxiliary carry flag. **7**

11. a) Explain hardware interrupt structure of $\mu p8085$ in detail. **8**

b) Write a program to exchange the blocks of 10 bytes which are present in memory from location 1000 H and 2000 H respectively. **5**

OR

12. a) Draw the timing diagram for the instruction 'LXI H, 1100H;' **8**

b) Explain RIM and SIM instruction of $\mu p8085$. **5**

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