

B.Tech. Third Semester (Computer Technology) (C.B.C.S.) Winter 2022
Digital Design & Fundamentals of Microprocessor

P. Pages : 2
Time : Three Hours



SPM/KW/22/2549
Max. Marks : 70

- 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. Due credit will be given to neatness and adequate dimensions.
 8. Illustrate your answers whenever necessary with the help of neat sketches.

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

b) Simplify the following & realize using logic gates 8
 $F(A, B, C, D) = \bar{A}BCD + \bar{A}\bar{B}C + \bar{A}\bar{C}D + \bar{A}\bar{C} + C$

OR

2. a) Simplify the following equation using k-map and implement the logic circuit using universal gates only. 7

$$f(A, B, C, D) = \Sigma m(2, 3, 5, 7, 9, 11, 12, 13, 14, 15)$$

b) Explain why NAND and NOR are called as universal gates. Also, design XOR gate using only four NAND gates. 7

3. a) Design a 4-bit binary to Gray code converter. 7

b) Implement full adder using two half adders and an additional gate if required. 7

OR

4. a) Implement 16:1 multiplexer using 4:1 multiplexers. 6

b) What is the difference between encoder & decoder? Explain priority encoder. 8

5. a) Explain race around condition and describe how it can be eliminated using master slave flip flop. 7

b) Design a 3 bit asynchronous up-down counter using T flip flop. 7

OR

6. a) Differentiate between synchronous and asynchronous counters. 7

b) Draw and explain J-K flip flop. 7

7. a) Draw and explain the architecture of 8085 microprocessor. 9
b) Explain the flag registers of 8085. 5

OR

8. a) How AD0-AD7 lines are demultiplexed. Explain with diagram. 7
b) Draw and explain the timing diagram of MVI B, 25 H. 7
9. a) Explain the following instructions of 8085: 10
i) LDA 5000H ii) DAA
iii) XTHL iv) SPHL
v) DAD B
- b) Explain the following pins of 8085: 4
i) ALE ii) READY
iii) HOLD iv) IO/M

OR

10. a) What are addressing modes? Explain the various addressing modes of 8085 with suitable examples. 7
b) Draw and explain the interrupt structure of 8085. 7

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