K16P 0099

Reg. No. : .....

Name : .....

I Semester M.C.A. Degree (Reg./Sup./Imp.) Examination, February 2016
(2014 Admn. Onwards)
MCA1C02 : DIGITAL SYSTEMS AND INTRODUCTION TO MICROPROCESSORS

Time : 3 Hours Max. Marks : 80

Instructions : *Section – **A** : Answer **any ten** questions. **Each** question carries **three** marks.*

*Section – **B** : Answer **all** questions. **Each** question carries **ten** marks.*

SECTION – A

Answer **any ten** questions. **Each** question carries **three** marks. **(10×3=30)**

1. Convert $(153)_{10}$ to octal.
2. Explain DeMorgans theorem in Boolean algebra.
3. Give the truth table of full substractor.
4. Write a note on encoders.
5. With a block diagram explain combinational circuit.
6. Write a note on universal shift register.
7. State various applications of shift registers.
8. Compare synchronous and asynchronous counters.
9. Explain Fan-in and Fan-out.
10. How a transistor can be used as a switch ?
11. What is the function of the accumulator ?
12. Explain the complete functioning of the following instructions in 8085 processor :
    i) ADD B ii) RSTI.

P.T.O.

SECTION – B

Answer **all** questions. **Each** question carries **ten** marks.

13. a) i) Convert the following expression in standard POS Form
$f(A, B, C) = (A + B)(B + C)(A + C)$. 5

ii) Simplify the expression $Z = AB + A\overline{B} \cdot \overline{(A\,\overline{C})}$. 5

OR

b) i) Explain the following function in standard SOP Form $F = AB + \overline{C}D + A\overline{B}C$. 5

ii) Prove that $\overline{X}\,\overline{Y}Z + \overline{X}YZ + X\overline{Y} = \overline{X}Z + X\overline{Y}$. 5

14. a) i) Simplify the following expression using Karnaugh map
$Y = \overline{ABC} + A\overline{BC} + \overline{AB}C + AB\overline{C} + \overline{A}B\overline{C}$ 5

ii) Compare the functions and applications of ROM, PLA and PAL. 5

OR

b) i) Reduce the following expression using k-map technique
$f(P, Q, R, S) = \Sigma m(0, 1, 4, 8, 9, 10) + d(2, 11)$. 5

ii) Implement the following boolean function with 8 : 1 multiplexer
$F(A, B, C, D) = \pi m(0, 3, 5, 8, 9, 10, 12, 14)$. 5

15. a) i) What is a race condition and explain how it is eliminated using J-K master slave flip flop ? 5

ii) Explain the operation of simple SR flip flop using NAND gates. 5

OR

b) i) Give the details of a master slave S-R flip flop and draw the logic diagram. 5

ii) What is a sequential circuit ? Discuss the different types of sequential circuits. 5

16. a) i) Give the comparison between TTL and CMOS families. 4

ii) Draw a standard TTL gate and explain its working. 6

OR

b) i) Draw and explain basic CMOS inverter circuit. 5

ii) Compare the Totem-pole and open-collector outputs. 5

17. a) i) Explain the architecture of intel 8085 with the help of a block diagram. 10

OR

b) i) Write a note on 8085 interrupts. 5

ii) How do the instructions of 8085 is classified based on their function and word length ? Give with an example. 5