



M 26827

Reg. No. : .....

Name : .....

I Semester M.C.A. Degree (Reg./Sup./Imp.) Examination, February 2015  
(2014 Admn.)

**MCA1C02 : DIGITAL SYSTEMS AND INTRODUCTION TO  
MICROPROCESSORS**

Time : 3 Hours

Max. Marks : 80

SECTION – A

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

1. Convert 2222 in Hexadecimal number.
2. Find the hex sum of  $(93)_{16} + (DE)_{16}$ .
3. Write the expression for Boolean function  $F(A, B, C) = (1, 4, 5, 6, 7)$  in standard POS form.
4. Write the truth table of NOR gate.
5. Distinguish between min. terms and max. terms.
6. What is a half adder ? And give its truth table.
7. Show how a 2 to 4 decoder circuit can be modified to 1 to 4 Dmux.
8. List out the application of flip-flop.
9. Name the various flag bits available in 8085 microprocessor.
10. List the interrupt signals of 8085.
11. What is the function of the accumulator ?
12. Specify the function of the address bus and the direction of the information flow on the address bus.

P.T.O.



## SECTION - B

**Note :** Answer all questions. Each question carries ten marks : (5x10=50)

13. a) i) Simplify the given expression to its Sum of Products (SOP) form. Draw the logic circuit for the simplified SOP function

$$Y = (A + B)(A + \overline{AB})C + \overline{A}(B + \overline{C}) + \overline{AB} + ABC \quad 4$$

- ii) State DeMorgan's theorem and illustrate with example. 3

- iii) Simplify the expressions using Boolean postulates

$$XY + \overline{XZ} + X\overline{YZ} (XY + Z) \quad 3$$

OR

- b) i) State Duality theorem and illustrate with example. 3

- ii) What are universal gates and why they are called so? 3

- iii) Simplify the expressions using Boolean postulates

$$Y = (A + B)(\overline{A} + C)(B + C) \quad 4$$

14. a) i) Design a 8 to 1 multiplexer by using the four variable function given by  $F(A, B, C, D) = \Sigma(0, 1, 3, 4, 8, 9, 15)$ . 5

- ii) With the help of a neat diagram explain design of a BCD adder circuit. 5

OR

- b) i) Minimize the logic function  $Y(A, B, C, D) = \Sigma(0, 1, 2, 3, 5, 7, 8, 9, 11, 14)$ . Use Karnaugh map. Draw logic circuit for the simplified function. 5

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

15. a) i) With relevant diagram explain the working of master-slave JK flip flop. 5

- ii) Explain the working of a DeMultiplexer with the help of an example. 5

OR

- b) i) What are synchronous counters? Design a Mod-5 synchronous counter using J-K Flip-Flops. 5

- ii) What is a Shift Register? What are its various types? List out some applications of Shift Register. 5



i) With the help of a circuit diagram explain the function of a TTL inverter totem-pole circuit and compare this with CMOS circuit. 5

ii) Explain the following assembler directives :  
ASSUME, EQU and DD. 5  
OR

b) i) With the help of circuit diagram and waveforms explain the function of a 4 bit Johnson's counter. 5

ii) Explain how a shift register can be used as a ring counter giving the wave forms at the output of the flip-flops. 5

a) i) Explain the architecture of Intel 8085 with the help of a block diagram. 10  
OR

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

ii) Explain various addressing modes in 8085. 5

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