



PG – 447

I Semester M.C.A. Degree Examination, January 2017  
(CBCS)  
COMPUTER SCIENCE  
MCA 103T : Digital Electronics and Microprocessor

Time : 3 Hours

Max. Marks : 70

*Instruction : Answer any five questions from Section – A and answer any four full questions from Section – B.*

SECTION – A

(5×6= 30)

1. a) Convert  $(345.765)_{10}$  to binary, octal and hexadecimal number system. (3+3)  
b) Subtract 10111 from 11000 using 2's complement method.
2. a) Simplify the expression  $f(A, B, C) = \overline{ABC} + \overline{AB} + BC$  and draw the logic diagram for the simplified expression. (3+3)  
b) State Demorgan's theorem and prove any one.
3. Express the Boolean expression  $f(x, y, z) = x + yz$  in SOP and POS form and write its minterm designation form.
4. Simplify the following function using K-map technique  
 $f(A, B, C, D) = \sum m(0, 1, 2, 3, 7, 8, 9, 10, 14)$  and draw the logic diagram for the simplified expression.
5. Define combinational logic circuit. With relevant truth table and expression show the implementation of full adder.
6. With a neat circuit diagram and truth table briefly explain the working of clocked T flipflop. Write its characteristic equation and excitation table.
7. Design mod 8 synchronous counter using D flipflop.
8. What is shift register ? Explain various types of shift register.

P.T.O.



## SECTION - B

(4×10=40)

9. a) Explain instruction queue and general purpose registers of 8085. (8+2)  
b) What is the memory addressing capability and maximum size of data segment memory?
10. a) Briefly explain MIN/MAX mode of operation of 8086. (4+6)  
b) Explain instruction template of 8086 with suitable example template.
11. Explain the function of following pins of 8086.  
i) ALE  
ii)  $\overline{\text{DEN}}$   
iii) HOLD  
iv)  $\overline{\text{M}/\text{IO}}$   
v)  $\overline{\text{BHE}}$
12. a) Explain memory addressing modes of 8086 with suitable example. (5+5)  
b) Write an assembly language program to multiply 8 bit number with 16 bit number.
13. Explain the following instructions of 8086  
i) MOV DL, CL  
ii) SUB BX, DX  
iii) CWD *Carry to*  
iv) OR CL, [BX + SI]  
v) JNB 8 bit
14. Explain hardware interrupts of 8086 in detail. Also explain how 8086 responds to occurrence of interrupt.
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PART – A

1. a) Simplify the Boolean function  $F(A, B, C)$  in SOP using don't care condition  $F = B + AC$ . 4  
b) Perform 2's complement for 101010. 2
2. Define : 6
  - i) BCD Numbers
  - ii) Demorgan's theorem.
  - iii) NAND Gate.
3. Construct full-adder from half-adder along with truth tables. 6
4. Explain various basic logic gates with truth table. 6
5. Explain with the functional block diagram, the architecture of 8085 microprocessor. 6
6. Explain the use of stack in the microprocessor based system with examples. 6
7. Write short notes on 3
  - a) I/O port addressing. 3
  - b) Bus buffering. 3
8. Explain : 6
  - i) CBW
  - ii) CMPS
  - iii) RET
  - iv) JCXZ
  - v) Set/reset flags
  - vi) Test.

P.T.O.



## PART – B

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|--|---|
| 9. i) Convert $(98.625)_{10}$ to its equivalent Hexa decimal number.   | 3 |
| ii) Convert $(CD.E8)_{16}$ to its equivalent binary number.  | 3 |
| iii) Explain 3-variable k-map.   | 4 |
| 10. i) Draw the circuit of D-flip-flop and discuss its working.  | 6 |
| ii) Describe the importance of combinational logic circuits.   | 4 |
| 11. i) Describe the programming model of 8086 along with registers.  | 8 |
| ii) Explain MIN/MAX mode of operations in microprocessor.  | 2 |
| 12. Explain the following instructions in 8086 :   |   |
| i) Data transfer instructions  | 5 |
| ii) PUSH, POP and exchange   | 5 |
| 13. i) The 8 databytes are stored from memory location E000H to E007H. Write 8086 ALP to transfer the block of data to new location B001H to B008 H. | 6 |
| ii) Compare microprocessors and microcomputers.  | 4 |
| 14. i) Define interrupt. Explain the priorities of interrupts.   | 5 |
| ii) Compare and contrast between subroutine and macros.  | 5 |
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