



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

(4x10=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{DEN}
iii) HOLD
iv) M/\overline{IO}
v) \overline{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 *Comb No*
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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PG – 262

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Instruction : Answer any five questions from Part – A and four questions from Part – B.

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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