



PJ – 576

I Semester M.C.A. Degree Examination, Jan./Feb. 2019
(CBCS)

COMPUTER SCIENCE

MCA 103T : Digital Electronics and Microprocessor

Time : 3 Hours

Max. Marks : 70

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

SECTION – A

Answer any five full questions. Each question carries six marks. (5×6=30)

1. a) Convert $(227.541)_{10}$ into equivalent binary, octal and hexadecimal number system. 3
- b) State and prove Demorgan's law. 3
2. Explain full adder circuit with mapping table and logic diagram.
3. Explain the basic gates using NAND gate only.
4. Explain 4×1 multiplexer with a neat diagram.
5. What is shift register ? Explain any two types in detail.
6. Explain the stack usage in microprocessor based system.
7. Write short notes on subroutines and macros.
8. Describe instruction template of 8086 with suitable example.

SECTION – B

Answer any four questions. Each question carries ten marks. (4×10=40)

9. a) Write the procedure for 2's complement subtraction method with an example. (5+5)
- b) $f(a, b, c, d) = \sum(0, 2, 4, 6, 8, 10, 12, 14)$, solve it using K-map.

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- 10. a) Draw the circuit of J-K Flip flop. How it is helpful in avoiding race around condition ?
b) Explain half adder circuit with an example. (5+5)
- 11. a) Explain the architectural diagram of 8085.
b) Write short notes on data transfer instructions. (5+5)
- 12. Explain the different types of addressing modes with an example. 10
- 13. Explain the pin diagram of 8086 with any five instructions. 10
- 14. Define interrupt. Explain the different types of interrupts used in 8086. 10



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MCA 103T : Digital Electronics and Microprocessor

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

SECTION – A

(5×6=30)

1. a) Convert $(276.756)_{10}$ to binary, octal and hexadecimal number system. (3+3)
b) Subtract 10110 from 11011 using 2's complement method.
2. a) Simplify the expression $f(x, y, z) = \overline{xy} + xyz + x(y + x\overline{y})$ and draw the logic diagram for the simplified expression. (4+2)
b) Prove that $A + \overline{AB} = A + B$.
3. a) Express the Boolean expression $f(x, y, z) = xy + \overline{z} + xz$ in SSOP form and write its minterm designation form. (4+2)
b) Write note on 8421 code.
4. Simplify the expression $f(w, x, y, z) = \sum m(0, 4, 5, 7, 8, 9, 13, 15)$ using K-map and draw the logic diagram for the simplified expression.
5. Show the implementation of half adder. Also construct half adder using only NAND gate.
6. Briefly explain the working of clocked SR flipflop. Write its characteristic equation and excitation table.
7. Design mod 7 synchronous counter using JK flipflop.
8. With neat circuit diagram, truth table and relevant waveform, explain the working of 3-bit binary asynchronous (ripple) counter.

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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

(5x6 = 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.

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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) $\overline{\text{DEN}}$
iii) HOLD
iv) $\text{M}/\overline{\text{IO}}$
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 *Comb W*
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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I Semester M.C.A. Degree Examination, January 2016
(CBCS)

COMPUTER SCIENCE

MCA-103T : Digital Electronics and Microprocessor

Time : 3 Hours

Max. Marks : 70

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 |