

MCA-02/PGDCA-02/MSc.IT-02/MIT(CS)-102**Digital logic/Introduction Digital Systems**

Master /P.G. Diploma in Computer Application/

Master of Science in Information Technology/

Master of Science (Cyber Security)

(MCA/PGDCA/M.Sc.(IT)-11/12/16/MSCCS-18)

First Semester Examination 2019

Time : 3 Hrs**Maximum Marks : 80**

Note : This paper is of Eighty (80) marks divided into three (03) sections A, B and C. Attempt the questions contained in these sections according to the detailed instructions given therein.

Section –A**(Long Answer Type Questions)**

Note : Section 'A' contains four (04) long answer type questions of nineteen (19) marks each. Learners are required to answer any two (02) questions only. (2x19=38)

1. Explain sequential circuits with example. Design a 3-bit synchronous UP/DOWN counter using T Flip-Flop.
2. Simplify the Boolean function $F(A,B,C,D) = \sum (1,5,8,9,10)$ in
(a) Sum of product and
(b) Product of sums.
3. Draw the block schematic of Magnitude comparator and explain its operation.
4. What is memory? Explain ROM family. How it is classified? Draw the block diagram of a typical (2048x16) bits ROM and describes its working principles.

Section – B

(Short Answer Type Questions)

Note : Section 'B' contains eight short answer type questions of Eight marks each. Learners are required to answer any 04 questions only. (4 x 8 =32)

1. Explain the principle of Duality with suitable example.
2. (i) Carry out subtraction using: 1's complement for $(101101-11001)_2$
(ii) Subtract 85 from 34 using 10's complement method.
3. Explain maxterm convert: $Y=AB+B'CD$ into product of maxterms by algebraic method.
4. Construct a full-subtractor using :
(i) basic gates (ii) NAND gates
5. Write the excitation table for JK FF and T FF. convert a D FF into JK FF. (FF means flip-flop)
6. Explain the principal of an encoder. draw a decimal to BCD encoder.
7. Design a 4-word by 8-bit RAM chip by connecting two 4x4 Ram chips.
8. Convert the following Gray codes to Binary codes.
(i) 11011 (ii) 100111

Section –C

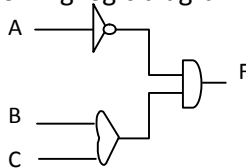
(Objective Type Questions)

Note : Section 'C' contains ten (10) objective type questions of one (01) mark each. All questions of this section are compulsory. (10 x 1 = 10)

1. What is the base of hexadecimal number system?
(a) 15 (b) 16
(c) 10 (d) None

2. According to the commutative law of addition
 - a) $AB=BA$
 - b) $A=A+A$
 - c) $A+(B+C)=(A+B)+C$
 - d) $A+B=B+A$
3. Which operation is called *Modulo-2-Sum* operation:
 - a) AND
 - b) OR
 - c) XOR
 - d) None of these

4. The following logic diagram :



Is represented by the function

- a) $A'.(B+C)$
 - b) $D=A'.(B+C)$
 - c) $D=A'.B+AC$
 - d) $D=A.(B+C)$
5. Magnitude comparator
 - a) Magnify any digital signal
 - b) Compares two multi bit binary number
 - c) compress binary numbers.
 - d) check error in a binary number
 6. Which of the following combinational circuit is called data selector
 - a) Decoder
 - b) Decoder/Demultiplexer
 - c) Demultiplexer
 - d) None of these

7. A 16-to-1 multiplexer has
 - a) 1 control lines
 - b) 2 control lines
 - c) 3 control lines
 - d) 4 control lines
8. Shift registers are
 - a) Basically a sequential circuit
 - b) a combinational circuit
 - c) permanent memory
 - d) None of these
9. T flip-flop is commonly used as:
 - a) a digital counter only
 - b) a delay switch
 - c) a digital counter and frequency divider
 - d) None of these
10. Register is a
 - a) Set fo capacitor used to register input instructions in a digital computer.
 - b) set to paper tapes and cards put in a file.
 - c) temporary storage unit within the CPU having dedicated or general purpose use
 - d) Part of the auxiliary memory
