Roll No. ……..

MCA–02/PGDCA–02/M. Sc. IT–02

Digital Logic

Master of Computer Application/P. G. Diploma in Computer Application/Master of Science in Information Technology (MCA–16/ MCA–11/PGDCA-16/PGDCA–11/ M. Sc. IT–16/M. Sc. IT–12)

First Semester, Examination, 2017

Time : 3 Hours **Max. Marks : 70**

Note : This paper is of **seventy (70)** marks containing **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 fifteen (15) marks each. Learners are required to answer *two* (02) questions only.

1. Simplify the (*a, b, c, d*) = (0, 1, 2, 5, 8, 9, 10) Boolean functions using four variable map in sum of product and product of sum form. Verify the results of both using truth table.
2. What is memory organization ? Explain the various memories.
3. Using a suitable logic diagram explain the working of a 1 to 16 demultiplexer.

4. Discuss in detail, the working of Full Adder logic circuit and extend your discussion to explain a binary adder, which can be used to add two binary numbers.

Section–B

(Short Answer Type Questions)

Note : Section 'B' contains eight (08) short answer type questions of five (5) marks each. Learners are required to answer *six* (06) questions only.

1. What do you mean by memory hierarchy ? Explain briefly.
2. Write short notes on the following :
   (i) EBCDIC
   (ii) ROM
3. Which logic named universal logic ? Draw a suitable diagram.
4. Convert the following numbers into :
   (i) $(A4B)_{16} = (?)_8$
   (ii) $(111010101)_2 = (?)_{10}$
5. Convert the following decimal numbers into gray code equivalent :
   (i) $(25)_{10}$
   (ii) $(39)_{10}$
6. What is decoder ? Draw the logic circuit of a 3 line to 8 line decoder.
7. What is encoder ? Draw the logic circuit of decimal to BCD encoder and explain its working.

8. Give the truth table of S-R and D-flip-flops. Convert the given S-R flip-flop to a D-flip-flop.

Section–C

(Objective Type Questions)

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

1. The hexadecimal number 'A0' has the decimal value equivalent to :
   (a) 80
   (b) 256
   (c) 100
   (d) 160

2. Excess-3 code is known as :
   (a) Weighted code
   (b) Cyclic redundancy code
   (c) Self-complementing code
   (d) Algebraic code

3. A NAND gate is called a universal logic element because :
   (a) Is is used by everybody.
   (b) Any logic function can be realized by NAND gate alone.
   (c) All the minimization techniques are applicable for optimum NAND gate realization.
   (d) Many digital computers used NAND gate only.

4. A full adder logic circuit will have :
   (a) Two inputs and one output
   (b) Three inputs and three outputs
   (c) Two inputs and two outputs
   (d) Three inputs and two outputs

5. The information in ROM is stored :
   (a) By the user any number of times
   (b) By the manufacture during fabrication of the device
   (c) By the user using ultraviolet light
   (d) By the user once and only once

6. For JK flip-flop J = 0, K = 1, the outlet after clock pulse will be :
   (a) 1
   (b) No change
   (c) 0
   (d) High impedance

7. Which of the following consume minimum power ?
   (a) TTL
   (b) CMOS
   (c) DTL
   (d) RTL

8. Boolean algebra is also called :
   (a) Arithmetic algebra
   (b) Linear algebra
   (c) Algebra
   (d) Switching algebra

9. De-Morgan's law over addition is :

   (a) $(x.y)' = x' y'$

   (b) $(x + y)' = x' + y'$

   (c) $(x + y)' = x' y'$

   (d) $(x + y)' = x'$

10. $x + y = y + x$ is the :

   (a) Commutative property

   (b) Inverse property

   (c) Associative property

   (d) Identity element