S-15 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/PGDCA/M.Sc. IT-11/12/16/17)

First Semester, Examination, 2018

Time : 3 Hours **Max. Marks : 80**

Note : This paper is of **eighty (80)** marks containing **three (03)** Sections A, B and C. Learners are required to 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 *two* (02) questions only.

1. What are Universal gate ? Explain the operations of 2-input XNOR gate and realize it using NOR gates.

2. What are the differences between asynchronous and synchronous counter ? Draw a MODE-8 counter and explain its working principle.

A-19 **P. T. O.**

3. What is memory ? Explain various types of memories in digital system. List the advantages and limitations of magnetic disk and magnetic tapes as a secondary storage device.

4. What is RAM ? Differentiate SRAM with DRAM. A memory chip is organized as (1024×4) bits RAM. Find the number of such chips required to obtain :

    (a) (2048×8) RAM

    (b)   4k bytes of RAM

Section–B

(Short Answer Type Questions)

Note : Section 'B' contains eight (08) short answer type questions of eight (8) marks each. Learners are required to answer *four* (04) questions only.

1. Find decimal equivalent of :

    (i) $(53A.0B4)_{16}$

    (ii) $(123.21)_8$

2. Convert the following Gray codes to Binary codes :

    (i)   11011

    (ii)   100111

3. Explain Maxterm and Minterm.

4. Define and describe De-Morgan's Theorem.

5. With truth table and logic diagram, explain the working of a full adder circuit.

6. Explain the principle of an encoder and decoder.

7. What are sequential circuits ? Distingish between combinational circuit and sequential circuit.

8. Differentiate between RISC and CISC architecture. Explain ROM family. Discuss the applications of ROM.

## Section–C

(Objective Type Questions)

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

1. The ASCII is a standard .... bits code.

   (a) 7

   (b) 6

   (c) 8

   (d) 4

2. Radix of binary number system is ....

   (a) 3

   (b) 4

   (c) 6

   (d) 2

3. Which one of the following is not a valid rule of Boolean algebra ?

   (a) $A + 1 = 1$

   (b) $A = A'$

   (c) $A . A = A$

   (d) $A . 1 = A$

A-19 **P. T. O.**

4. According to the associative law of addition :

    (a)   AB = BA

    (b)   A = A + A

    (c)   A + (B + C) = (A + B) + C

    (d)   A + B = B + A

5. The following logic diagram :
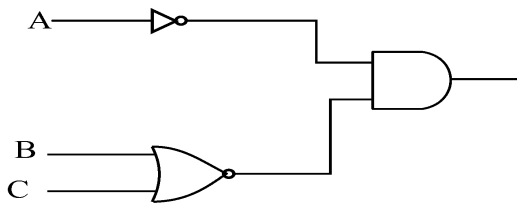
    is represented by the function :

    (a)   D = A′ . (B + C)

    (b)   D = A′ . (B + C)′

    (c)   A′ . B + AC

    (d)   D = A . (B + C)

6. Shift register are :

    (a)   basically a sequential circuit

    (b)   a combinational circuit

    (c)   permanent memory

    (d)   None of these

7. A 8-to-1 multiplexer has :

    (a)   1 control lines

    (b)   2 control lines

    (c)   3 control lines

    (d)   4 control lines

A-19

8. A half-adder can add :

    (a) Two binary bit

    (b) Two binary number of 4 bit each

    (c) Add half of a binary number

    (d) None of these

9. A simple flip-flop :

    (a) is 2 bit memory

    (b) is 1 bit memory

    (c) is a four state device

    (d) has nothing to do with memory

10. Volatile memory device is :

    (a) ROM

    (b) RAM

    (c) Both of the above

    (d) None of these