

Roll No.

**MCA-02/PGDCA-02/
M. Sc. IT-02/MIT(CS)-102**

Digital Logic/Introduction Digital Systems

Master of Computer Application/
P. G. Diploma in Computer Application/
Master of Science in Information Technology/
Master of Science (Cyber Security)
(MCA/PDGCA/M.Sc.IT-11/12/16/MSCCS-18)
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. Define combinational circuit with example. Explain the function of a multiplexer. Draw the logic diagram of 4-to-1 multiplexer.
2. What is universal shift register ? Explain the operation of universal shift register with neat block diagram
3. Design an Excess-3 to BCD code convertor. Use don't care condition.

(B-94) P. T. O.

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 :
- (2048×8) RAM
 - 4K bytes of RAM

Section-B

(Short Answer Type Questions)

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

- What are the differences between asynchronous and synchronous counter ?
- State and prove the DeMorgan's theorem for two variables.
- Convert the following to its decimal equivalent :
 - $(81B6.F)_{16}$
 - $(765.45)_8$
- Perform the following by 2's complement method :
 - $10101 - 11011$
 - $100011 - 1111$
- Explain Minterm. Convert :
 $Y = ABCD + A'BC + B'C'$ into sum of minterms by algebraic method.
- What is edge-triggered and master-slave flip-flop ?
- What is a decoder ? Explain 3 to 8 decoder with logic diagram.
- Construct a Full-Adder using :
 - Basic gates
 - NOR gates

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. A Nibble consists of bits.
(a) 2 (b) 4
(c) 8 (d) 16
2. According to the Distributive law :
(a) $AB = BA$
(b) $A = A + A$
(c) $A(B + C) = AB + AC$
(d) $A + B = B + A$
3. The basic building block for a logical circuit is :
(a) A Flip-Flop
(b) A Logical Gate
(c) An Adder
(d) None of the above
4. The output of an OR gate with three inputs A, B and C is low when :
(a) $A = 1, B = 1, C = 0$
(b) $A = 0, B = 0, C = 1$
(c) $A = 0, B = 0, C = 0$
(d) $A = 1, B = 0, C = 1$
5. 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

6. An encoder :
- (a) converts a digital input to another form of digital output.
 - (b) converts analog input to digital output.
 - (c) selects one out of many inputs.
 - (d) None of these
7. Demultiplexer is also called :
- (a) Data selector
 - (b) Data router
 - (c) Data encoder
 - (d) Data distributor
8. The operation of J-K flip-flop is similar to that of the SR flip-flop except that the J-K flip-flop :
- (a) It does not accept asynchronous inputs
 - (b) Sets to clear when both $J = 0$ and $K = 0$
 - (c) It does not show transition on change in pulse
 - (d) Doesn't have an invalid state.
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) RAM
 - (b) ROM
 - (c) Both of the above
 - (d) None of these