

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
First Semester, Examination, 2017

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

Note : This paper is of **eighty (80)** 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 nineteen (19) marks each. Learners are required to answer *two* (02) questions only.

1. Simplify the Boolean function $F(A, B, C, D) = \sum (1, 3, 7, 11, 15)$ using the Don't care condition $d(A, B, C, D) = \sum (0, 2, 5)$ in (a) sum of product and (b) product of sums.
2. What are universal gate ? Explain the operation of 2-input XOR gate and realize it using NOR gates.
3. Draw and explain the operation of a 4-bit parallel adder.

4. Define combinational circuit with example. Draw and explain the working of a 3-to-8 decoder.

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. Subtract $(1010101)_2 - (1001001)_2$ by 2's complement method.
2. Convert the following binary no. to gray code no. :
 - (i) 11011
 - (ii) 10110
3. How are the Don't care conditions useful ?
4. Explain the function of a multiplexer.
5. What are flip-flops ? Draw an RS flip-flop and its truth table, using NOR gate.
6. What is called racing ? To get rid of racing what techniques are used ?
7. What is flash memory ? Where is it used ?
8. Define memory access time and memory cycle time.

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 systematic reduction of logic circuits is accomplished by :
 - (a) Symbolic reduction

- (b) Truth table
 - (c) Boolean Algebra
 - (d) TTL logic
2. The inverter is
- (a) NOT gate
 - (b) OR gate
 - (c) AND gate
 - (d) None of these
3. 1 Kilo bits are equal to :
- (a) 1000
 - (b) 1008
 - (c) 1012
 - (d) 1024
4. If both inputs are 0 in a 2-input NOR gate, then the output will be :
- (a) 0
 - (b) 1
 - (c) high
 - (d) None of these
5. According to the associative law of addition :
- (a) $x + y = y + x$
 - (b) $x (yz) = (xy) z$
 - (c) $xy = yx$
 - (d) $x (y + z) = xy + xz$

6. Addition of three bits can be performed by :
 - (a) Half-adder
 - (b) Full-adder
 - (c) Both half adder and full adder
 - (d) None of these
7. Flip-flop is basically :
 - (a) Mono-stable multivibrator
 - (b) Astable multivibrator
 - (c) Bi-stable multivibrator
 - (d) None of these
8. A 3-variable Karnaugh map has :
 - (a) Eight cells
 - (b) Three cells
 - (c) Sixteen cells
 - (d) Four cells
9. A decoder with n input lines contains maximum of :
 - (a) $2n$ output lines
 - (b) n output lines
 - (c) 1 output line
 - (d) n^2 output lines
10. The storage element of static device RAM is :
 - (a) Diode
 - (b) Register
 - (c) Capacitor
 - (d) Flip-flop