

Roll No.

BCA-01

Computer Fundamental and Introduction to Digital Logic

Bachelor of Computer Application
(BCA-11/16/17)

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. Answer the following questions :
 - (a) Discuss about computer generations in detail with the important features and example. 8
 - (b) What is postulates in Boolean Algebra ? Why is Boolean algebra relevant in the design of logic circuits of computers ? 8
 - (c) Convert $(5A6B)_{16}$ to its decimal equivalent. 1

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- (d) Convert $(125)_{10}$ to its octal equivalent. 1
- (e) Calculate 2's complement of the binary number 111101. 1
2. Answer the following questions :
- (a) What is the dual of a Boolean expression ? What is the difference between dual and complement ? 7
- (b) How will you represent Boolean expression in Canonical form ? How are the sum of product form of logical expression are written in $\Sigma(N_1, N_2, \dots)$ form ? 7
- (c) Determine by means of a truth table the validity of De Morgan's theorem for three variables :
 $(ABC)' = A' + B' + C'$ 2 $\frac{1}{2}$
- (d) What is a Keyboard encoder and what are its functions ? 2 $\frac{1}{2}$
3. Answer the following questions :
- (a) What is the purpose of providing registers in a CPU ? Describe various registers which are usually provided in a microprocessor. 7
- (b) What are the various types of memory ? Discuss their merits, demerits and area of applications. 7
- (c) What is Instruction format ? Explain various types of instruction format with suitable example. 5
4. Explain the following terms in detail :
- (a) Fixed point representation 5

- | | |
|-----------------------------------|---|
| (b) Floating point representation | 5 |
| (c) Logic gates | 2 |
| (d) Magneto-Optical disk | 5 |
| (e) Buses | 2 |

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.

1. What is sum of products form and product of sums form in logic expression ? Explain with suitable examples.
2. Simplify the following expression using Boolean algebra :
 - (a) $AB + A(D + CD')$
 - (b) $(BC' + A'D)(AB' + CD')$
3. What are Boolean theorems ? Discuss their usefulness.
4. Answer the following questions :
 - (a) Subtract binary number 10001.0011 from 10101.1010.
 - (b) Subtract binary number 1110 from 11011 using 2's complement.
 - (c) Add binary number 110111.11 to 11011101.0101.
 - (d) Add binary number 1101 to 0110.
5. Represent the following numbers using floating point notation. (Assume 16 bit word) :
 - (a) 10010.1100
 - (b) 10011110.10
 - (c) 0.000001011010

6. Explain flip-flop with its types.
7. What is Primary Memory ? Explain primary memory with its characteristics.
8. Write short notes on the following :
 - (a) ASCII
 - (b) Number System
 - (c) ALU
 - (d) Gray code

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. 1's complement of 1011101 is :
 - (a) 0100010
 - (b) 1011100
 - (c) 1011101
 - (d) 0101010
2. On addition of 28 and 18 using 2's complements, we get :
 - (a) 00101110
 - (b) 0101110
 - (c) 00101111
 - (d) 1001111

3. The involution of A is equal to :
 - (a) A
 - (b) A'
 - (c) 1
 - (d) 0
4. ASCII stands for :
 - (a) American Standard Code for Information Interchange
 - (b) American Standard Code for Interchange Information
 - (c) American Standard Code for Information Identity
 - (d) None of the above
5. Which of the following are known as universal gates ?
 - (a) AND and OR
 - (b) NAND and NOR
 - (c) XOR and OR
 - (d) None of the above
6. A full adder logic circuit will have :
 - (a) Two inputs and one outputs
 - (b) Three inputs and three outputs
 - (c) Two inputs and two outputs
 - (d) Three inputs and two outputs
7. How many types of sequential circuits are there ?
 - (a) 3
 - (b) 4
 - (c) 2
 - (d) 6

8. Which one of the following is known as brain of a computer ?
- (a) Operating System
 - (b) Software
 - (c) CPU
 - (d) None of the above
9. How many types of flip-flops are there ?
- (a) 2
 - (b) 3
 - (c) 4
 - (d) 5
10. How many NOT gates are required for the construction of a 4-to-1 multiplexer ?
- (a) 2
 - (b) 3
 - (c) 4
 - (d) 5