S-507 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) Convert $(272.25)_{10}$ to its binary, octal and hexadecimal equivalent. 5

   (b) Describe the construction and working of a full-adder. 5

   (c) Perform the following operations : 5

      (i) Subtract $(10111001.11)_2$ from $(110011110001.01)_2$

(ii) Find the 9's complement of $(564610)_{10}$

(iii) Find the l's complement of $(10110110)_2$

(iv) Find the 10's complement of $(1012398)_{10}$

(v) Find the 2's complement of $(0110111)_2$

(d) Explain the working of AND, OR, NOT and XOR gate with truth table and diagram. How are they useful ? 4

2. Answer the following questions :

(a) Explain functions of Memory. 4

(b) Explain types of Memory. 5

(c) Explain the following : 5

(i) Bus

(ii) Optical Disk

(iii) LAN

(iv) Volatile memory

(v) Non-Volatile Memory

(d) Discuss Universal Gates. Create NAND Gate using NOR Gates only. Create NOR Gate using NAND Gates only. 5

3. Answer the following questions :

(a) Draw the circuit diagram and show with the help of truth table the following : 5

(i) (A + B . C) + (A . B + C) . (A . B)

(ii) (A . B + C) . (A . B + C) + (A . B)

(b) Explain De-Morgan's theorem with example and truth table. 5

(c) Explain ROM. Also explain PROM, EPROM, EEPROM and examples of each type of ROM. 4

(d) Explain Encoder and Decoder with working and block diagram. 5

4. Answer the following questions :

(a) Explain all the Generations of Computers with technology used. 9

(b) Explain Synchronous and Asynchronous Counter. 5

(c) Implement the following with a multiplexor : 5

$$F(A, B, C, D) = \Sigma (0, 1, 3, 4, 8, 9, 15)$$

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 are registers ? Explain any register with functioning and diagram.
2. What is a shift register ? Explain its working with diagram.
3. What is Flip-Flop ? Why is it used ? Explain any kind of flip-flop with diagram.
4. Discuss the construction and working of half adder with logic diagram and truth table.
5. Explain working and functions of various types of RAM and ROM.
6. What are input devices and output devices ? Explain any *three* input devices and any *three* output devices.

7. Explain the working and functions of various components of CPU.
8. Discuss Universal Gates. Create NAND Gate using NOR Gates only and verify using truth table. Create NOR Gate using NAND Gates only and verify using truth table.

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. AND operation is equivalent to :
   (a) Division
   (b) Union
   (c) Intersection
   (d) Both (b) and (c)
2. In Boolean algebra, OR is represented by :
   (a) +
   (b) –
   (c) /
   (d) ×
3. LSI means :
   (a) Large Symbol Integration
   (b) Large Scale Integration
   (c) Large Symbol Invertor
   (d) Large Scale Invertor

4. The half adder performs :
   (a) Decimal addition operation for 2 decimal inputs
   (b) Binary addition operation for 2 binary inputs
   (c) Decimal addition operation for 2 binary inputs
   (d) Binary addition operation for 2 decimal inputs

5. Complement of NOR and OR gate is _____ and _____ respectively.
   (a) AND, NAND
   (b) NAND, AND
   (c) OR, NOR
   (d) NOR, OR

6. A binary number system is of base _____.
   (a) 1
   (b) 2
   (c) 4
   (d) 10

7. How many inputs will a decimal-to-BCD encoder have ?
   (a) 4
   (b) 8
   (c) 10
   (d) 16

8. A 64-bit word consists of _____.
   (a) 4 bytes
   (b) 8 bytes
   (c) 10 bytes
   (d) l2 bytes

9. 1's complement of 11001010 is :

   (a) 11001011

   (b) 11001001

   (c) 00110101

   (d) 00110111

10. 2's complement of 10101011 is :

   (a) 01010101

   (b) 00111100

   (c) 10101011

   (d) 10101100