Roll No. ....

OLE-97664

BCA 1st Semester (New)
Examination – April, 2021
LOGICAL ORGANIZATION OF COMPUTER-I
Paper : BCA-104

Time : Three hours]   *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. **1** is *compulsory*. Attempt *four* questions by selecting one question from each Unit. All questions carry equal marks.

1. (a) What is Unicode ? State its relevance. $2 \times 8 = 16$

   (b) Which number system is followed in digital computers and why ?

   (c) What is BCD adder ?

   (d) What is meant by digital logic ? Explain.

   (e) What is the smallest and largest integer number represented in a 32-bit computer ?

   (f) What are code converters ?

   (g) What is the difference between Boolean algebra and Real algebra ?

(h) What are De-multiplexers ? State their importance.

UNIT – I

2. (a) What do you mean by parity bits ? How are these relevant in error-detection and correction codes ? Illustrate through suitable examples.   7

(b) Find out the values of X. Y and Z in the following :   9

$$(82.875)_{10} = (X)_2 = (Y)_8 = (Z)_{16}$$

3. Explain the following :

(a) Character Codes   8

(b) Floating-point Representation of numbers   8

UNIT – II

4. (a) What is principle of Duality? Illustrate.   6

(b) Simplify the following Boolean expression using K-map :   10

$F(a, b, c) = \Sigma\ (1, 2, 4, 5, 6, 7)$

and realize the same using NOR gates.

5. Explain the following :

(a) Boolean Algebra   6

(b) SOPs and POSs   5

(c) Venn diagrams   5

UNIT – III

6. (a) What are AND-OR-INVERT and OR-AND-INVERT implementation ? Explain. 4

(b) What do you mean by multilevel NAND and NOR circuits ? Illustrate. 4

(c) What is combinational circuit ? What are its characteristics ? Detail out the procedure for design of combinational circuit. 8

7. (a) What are Universal Gates? Why these are named so ? Justify. 6

(b) Design a combinational circuit that receives 3-bit binary input and produces its 2's complement. 10

UNIT – IV

8. (a) What is a full-adder ? Design a full-adder and implement the same using gates. 8

(b) What is a multiplexer ? How does it work? What are its applications ? Explain. 8

9. Explain the following :

(a) Magnitude Comparators 8

(b) BCD to seven-segment Decoder 8