

- (c) What are AND-OR-INVERT and OR-AND-INVERT implementation ? Explain. 5

UNIT – IV

8. (a) What is a full-subtractor ? Design a full-subtractor and implement the same using gates. 8
- (b) What is a BCD to seven-segment Decoder ? Design and implement it. 8
9. Explain the following :
- (a) Multiplexer 8
- (b) Magnitude Comparators 8

Roll No.

97664

**BCA 1st Semester (New)
Examination – November, 2019**

LOGICAL ORGANIZATION OF COMPUTERS-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 are code converters ?
- (b) What are encoders ?
- (c) What do you mean by digital logic ? Explain.
- (d) What is Unicode ? State its relevance.

- (e) What is the smallest and largest integer number represented in a 32-bit computer ?
- (f) What are Boolean Theorems ?
- (g) What are DeMorgan's Laws ?
- (h) What are Demultiplexers ? State their importance.

$$2 \times 8 = 16$$

UNIT – I

- 2. (a) What are BCD codes ? What is their significance ?
Discuss. 4
- (b) Find out the values of X, Y and Z in the following : 12
 $(A23.F)_{16} = (X)_2 = (Y)_8 = (Z)_{10}$
- 3. Explain the following :
 - (a) Character Codes 8
 - (b) Error detection and correction codes 8

UNIT – II

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

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

$$F(a, b, c, d) = \sum (1, 2, 3, 4, 5, 6, 7, 9, 11, 12, 13, 14, 15) \text{ and obtain the expression in both SOP and POS.} \quad 12$$

- 5. Explain the following :

- (a) Canonical forms of Boolean Functions 5
- (b) Venn diagrams 5
- (c) De-Morgan's Law 6

UNIT – III

- 6. (a) What is combinational circuit ? What are its characteristics ? Detail out the procedure for design of combinational circuit. 8
- (b) Design a combinational circuit that receives 2-bit binary input and produces its square at the output. 8
- 7. (a) What are Universal Gates ? Why these are named so ? Justify. 6
- (b) What do you mean by multilevel NAND and NOR circuits ? Illustrate. 5