

Roll No. ....

**97664**

**BCA 1st Semester (New)  
Examination – November, 2018  
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 :** Attempt *four* questions by selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) What is BCD adder ?  $2 \times 8 = 16$   
(b) What is meant by digital logic ? Explain.  
(c) What is the difference between Boolean Algebra and Real Algebra ?  
(d) Which number system is followed in digital computers and why ?  
(e) What are Demultiplexers ? State their importance.  
(f) What is Unicode ? State its relevance.  
(g) What is the smallest and largest integer number represented in a 32-bit computer ?  
(h) What are code converters ?

### UNIT – I

2. (a) What are 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
- $$(75.75)_{10} = (X)_2 = (Y)_8 = (Z)_{16}$$
3. Explain the following :
- (a) Floating-point Representation of numbers 8
- (b) Character codes 8

### UNIT – II

4. (a) What is principle of Duality ? Illustrate. 6
- (b) Simplify the following Boolean expression using K-map : 10
- $$F(a,b,c) = \Sigma(1,4,5,6,7)$$
- and realize the same using NAND gates.
5. Explain the following :
- (a) SOPs and POSs 5
- (b) Venn diagrams 5
- (c) Boolean Algebra 6

### UNIT – III

6. (a) What are Universal Gates ? Why these are named so ? Justify. 6
- (b) Design a combinational circuit that receives 4-bit binary input and produces its 2's complement. 10

7. (a) What do you mean by multilevel NAND and NOR circuits ? Illustrate. 4
- (b) What are AND-OR-INVERT and OR-AND-INVERT implementation ? Explain. 4
- (c) What is combinational circuit ? What are its characteristics ? Detail out the procedure for design of combinational circuit. 8

### UNIT – IV

8. (a) What is a multiplexer ? How does it work ? What are its applications ? Explain. 8
- (b) What is a full-adder ? Design a full-adder and implement the same using gates. 8
9. Explain the following :
- (a) BCD to seven-segment Decoder 8
- (b) Magnitude Comparators 8