

Roll No.

97664

B.C.A. 1st Semester (New)

Examination- November, 2016
Logical Organisation of Computer-I

Paper-BCA-104

Time : 3 hours

Max. 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 the examination.

Note : Question No. 1 is **compulsory**. Attempt

four questions by selecting **one** question from each Unit. All questions carry equal marks.

[2×8=16]

1. (a) What are digital signals? Explain.

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

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

(c) What are AND-OR-INVERT and OR-AND-INVERT implementation? Explain. [4]

7. (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 1's complement. [10]

Unit-IV

8. (a) What is a multiplexer? How does it works? What are its applications? Explain. [8]

(b) What is a parallel adder? Design a 4-bit parallel adder. [8]

9. Explain the following :

(a) BCD to seven-segment Decoder [8]

(b) Comparators [8]

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(1)

[Turn Over

- (c) What is a normalized number? Outline its essence.
- (d) What are Venn Diagrams ?
- (e) What are Demultiplexers ? State their importance.
- (f) What is Unicode? State its relevance.
- (g) What is a full-adder?
- (h) What is Duality principle?

Unit-1

- 2. (a) What do you understand by BCD codes ? What is their significance ? Illustrate. [4]
- (b) Find out the values of X, Y and Z in the following :

$$(C8.A)_{16} = (X)_2 = (Y)_8 = (Z)_{10}. \quad [12]$$

- 3. Explain the following :

- (a) Character Codes [8]
- (b) Error detection and correction codes [8]

Unit-II

- 4. (a) What is De Morgan's Theorem? How is it useful? Illustrate its uses with suitable examples. [6]
- (b) Simplify the following Boolean expression using K-map :
 $F(x, y, z, w) = \Sigma (0, 1, 2, 4, 5, 6, 8, 9, 12, 13, 14)$ and obtain the expression in SOP and POS. [10]

- 5. Explain the following :

- (a) Multilevel NAND and NOR circuits [5]
- (b) Boolean Algebra [6]
- (c) Standard forms of Boolean functions [5]

Unit-III

- 6. (a) What is combinational circuit? What are its characteristics? Detail out the procedure for design of combinational circuit. [8]