

Roll No.

97664

**B.C.A. 1st Semester (New)
Examination–November, 2014**

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.

1. (a) What is Unicode ? State its relevance.

8×2=16

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

(c) What are Boolean theorems ?

(d) Prove $x.y' + y.z' + z.x' = x'.y + y'.z + z'.x$, algebraically.

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(1)

[Turn Over

- (e) What are digital signals ? Explain.
- (f) What are code converters ?
- (g) What are encoders ?
- (h) What are demultiplexers ? State their importance.

UNIT - I

2. (a) What is a number system ? Which number system is followed in digital computers and why ? 4

(b) Find out the values of X, Y and Z in the following : 12

$$(97.750)_{10} = (X)_2 = (Y)_8 = (Z)_{16}$$

3. Explain the following :

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

UNIT - II

4. (a) What is De Morgan's theorem ? How is it useful ? Illustrate its use with suitable examples. 6

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

$$F = D'.C'.B'.A' + D'.C'.B.A' + D.C.B.A' + D.C'.B'.A' + D.C'.B.A'$$

and realize the same using NAND gates.

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5. Explain the following :

- (a) Venn diagrams 5
- (b) Boolean Algebra 6
- (c) Standard forms of Boolean Functions 5

UNIT - III

- 6. (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
 - (c) What are AND-OR-INVERT and OR-AND-INVERT implementation ? Explain. 5
7. (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 cube at the output. 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) Comparators 8
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