

- (c) What do you mean by multilevel NAND and NOR circuits ? Illustrate. 4,8,4

Unit-IV

8. (a) What is a Multiplexer ? How does it work ? What are its applications ? Explain.
(b) What is a Parallel Adder ? Design a 4-bit parallel adder. 8,8
9. Explain the following :
(a) BCD to seven-segment Decoder
(b) Comparators 8,8

Roll No. :

Total No. of Questions : 9] [Total No. of Pages : 4

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**BCA 1st Semester (New)
(Full & Reappear)
Examination, March-2021**

**LOGICAL ORGANISATION 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 :- Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

1. (a) What is Unicode ? State its relevance.
(b) What is a Full-adder ?
(c) What is Duality principle ?
(d) What are Digital Signals ? Explain.

- (e) What are Venn Diagrams ?
- (f) Which number system is followed in digital computers and why ?
- (g) What is a Normalized Number ? Outline its essence.
- (h) What are Demultiplexers ? State their importance. $2 \times 8 = 16$

Unit-I

2. (a) Find out the values of X, Y and Z in the following :
 $(AA.C)_{16} = (X)_2 = (Y)_8 = (Z)_{10}$
- (b) What do you understand by BCD Codes ? What is their significance ? Illustrate. 12,4
3. Explain the following :
- (a) Character Codes
- (b) Error Detection and Correction Codes 8,8

Unit-II

4. Explain the following :
- (a) Multilevel NAND and NOR Circuits
- (b) Boolean Algebra
- (c) Standard forms of Boolean Functions 5,6,5

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

Unit-III

6. (a) What are AND-OR-INVERT and OR-AND-INVERT implementation ? Explain.
- (b) Design a combinational circuit that receives 4-bit binary input and produces its 2's complement. 6,10
7. (a) What are Universal Gates ? Why are these named so ? Justify.
- (b) What is Combinational Circuit ? What are its characteristics ? Detail out the procedure for design of combinational circuit.