

Roll No.

Total Pages : 03

BCA/D-20

1193

LOGICAL ORGANIZATION OF
COMPUTER-I
BCA-114

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit in addition to compulsory Q. No. 1. All questions carry equal marks.

(Compulsory Question)

1. (a) What do you mean by Fixed Point Representation of Numbers ?
- (b) Differentiate between Coding and Convention ?
- (c) What do you mean by Switching Algebra ?
- (d) What are Boolean Postulates ?
- (e) What do you mean by Universal Gate ?
- (f) Explain NAND Gate.
- (g) Differentiate between Multiplexer and Demultiplexer.
- (h) Draw the logic diagram of Half Adder. **8×2=16**

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Unit I

2. Represent the decimal No. 8620 in :
- (a) BCD
 - (b) Excess-3 code
 - (c) 2421 Code
 - (d) as a Binary Number. **16**
3. (a) Solve the following : **8**
- (i) $(130)_{10} = (?)_3$
 - (ii) $(1000)_3 = (?)_{10}$
 - (iii) $(8554)_{10} = (?)_6$
 - (iv) $(221)_6 = (?)_{10}$
- (b) Perform the following using 8-bit notation and 2's Complement : **8**
- (i) $(78)_{10} - (36)_{10}$
 - (ii) $-(45)_{10} - (35)_{10}$

Unit II

4. (a) What is Venn Diagram ? Draw Venn diagram for AND, OR, NOT operations. Also prove Second Absorption Law $a + (\bar{a}b) = a + b$ using Venn diagram. **10**
- (b) Simplify $\bar{X}\bar{Y} + X + XY$. **6**

5. (a) Convert the expression $F = (\bar{X} + Y)X + Z(Y + Z)$ into standard POS form. **8**
- (b) Examine the validity of : **8**
- $$(XY).(YZ) = (\bar{X} + \bar{Y}).(\bar{Y} + \bar{Z})$$

Unit III

6. What is Combinational Logic ? What are its characteristics ? Explain the analysis procedure of Combinational logic. **16**
7. Implement the following Boolean Functions using NOR gate :
- (a) $F = (A + \bar{B} + C)(A + \bar{B} + \bar{C})(A + \bar{B} + C)(\bar{A} + \bar{B} + C)$
- (b) $F = \bar{A}BC + \bar{A}B\bar{C} + A\bar{B}\bar{C} + ABC$. **16**

Unit IV

8. What is Multiplexer ? Explain all types of Multiplexer by using an example. **16**
9. (a) Explain Half Subtractor. **8**
- (b) What is Decoder ? Design 5×32 decoder with the help of 3×8 decoder. **8**