6/12
220

Sr. No. 311109

DECEMBER- 2023

BCA Re-Appear, 1st SEMESTER

Logical Organization of Computer-I (BCA-17-104)

Time: 3 Hours **Max. Marks:75**

Instructions :
1. *It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART -A

Q1 (a) What is the difference between SOP and POS forms? (1.5)

(b) Find the number of locations in memory if 16-bit address bus is used? (1.5)

(c) Write full forms of ASCII, EBCDIC, IEEE (1.5)

(d) What is the size of memory if FFFF is the last address that can be referenced for memory chip? (1.5)

(e) State De-Morgan's law with an example. (1.5)

(f) What is the difference between bit and byte? (1.5)

(g) What is a Venn diagram? (1.5)

(h) Convert from infix to postfix notation : A+B*[C*D+E*(F+G)] (1.5)

(i) How does a multilevel NAND circuit works? (1.5)

(j) Why is floating point number more difficult to represent and process than a fixed point integer? (1.5)

PART -B

Q2 (a) Simplify and minimize using K-Map the following function (8)
$F= \sum (0,2,3,5,7,9,11,13,14)$

(b) Find the POS form for the boolean function (7)
$F(A,B,C,D)= \sum (0,1,2,5,8,9,10)$

Q3 (a) Simplify the Boolean expression using Boolean algebra (6)
(i) $\bar{x}\bar{y}z+\bar{x}yz+x\bar{y}$
(ii) $xyz+\bar{x}z+yz$

(b) Implement the following functions using NAND and inverter gates (5)
F=AB+A'B'+B'C

(c) What is parity checker? Using logic gates, Construct a 4-bit even parity generator (4)

Q4 (a) What are universal gates? And why are they called so? Explain with the help of suitable example. (6)

(b) A lighting system used at the staircase makes use of two switches with one being at the top and other at the bottom of the stairs. Make a truth table for this given system. Give its logical equation in SOP form. Also, Realize the circuit (9)

311109/220/111/454

using minimum (i) NAND (ii) NOR gates

Q5 (a) Perform the following binary operations: (6)

(i) 1011+1010
(ii) 1011-0101
(iii) 11011*11

(b) Perform the following conversions: (5)

(iv) $(371)_8 = (?)_{10}$
(v) $(9050)_{10} \equiv (?)_{16}$
(vi) $(101001100001)_2 = (?)_{16}$
(vii) $(10110011.0101)_2 = (?)_{10}$
(viii) $(BF2)_{16} = (?)_8$

(c) Write note on different Character codes. Explain with suitable examples. (4)

Q6 (a) Design a 5× 32 decoder using 3×8 decoder. Explain with proper tabulation. (8)

(b) Implement the function using MUX $F=\sum(2,4,6,8,9,15)$ (7)

Q7 (a) Explain BCD codes and their usage in computer systems, What is the difference between BCD and Gray codes? (9)

(b) Implement a 4-bit full adder using suitable half adders (6)

****