Roll No. .....

Total Pages : 3

204104

Dec., 2018

BCA, Ist Semester

LOGICAL ORGANIZATION OF COMPUTER–1

(BCA-17-104)

Time : 3 Hours] [Max. Marks : 75

Instructions :

(i) It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.

) Answer any four questions from Part -B in detail.

) Different sub-parts of a question are to be attempted adjacent to each other.

BCA

PART–A

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

(b) Find the octal equivalent of $(111100101)_2$ (1.5)

(c) Define : bit, byte, word. (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) Represent –222 in signed 2's complement notation. (1.5)

(g) Convert BCD 268 into binary, octal and hexadecimal representation. (1.5)

(h) Convert from infix to postfix notation :

A+B*[C*D+E*(F+G)] (1.5)

(i) How can the parity bit be used to check a given code word in odd parity system? (1.5)

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

PART–B

2. (a) Using signed 2's complement representation, perform the arithmetic operations given below with binary numbers and with negative numbers. Use 7 bits to accommodate each number together with its sign. In each case determine if there is an overflow.

(i) (+35) + (+40)

(ii) (–35) + (–40) (10)

(b) Write note on different Character codes. Explain with suitable examples. (5)

3. (a) Simplify and minimize using K-Map the following function

$F = \Sigma (0,2,3,5,7,9,11,13,14)$ (8)

(b) Find the POS form for the boolean function

$F(A,B,C,D) = \Sigma (0,1,2,5,8,9,10)$ (7)

4. (a) Simplify the Boolean expression using Boolean algebra

(i) $\bar{x}\bar{y}z + \bar{x}yz + x\bar{y}$

(ii) $xyz + \bar{x}z + yz$ (6)

(b) Implement the following functions using NAND and inverter gates

$F = AB + A'B' + B'C$ (5)

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

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

(b) Implement the function using

MUX $F = \Sigma(0,1,3,4,8,9,15)$ (7)

6. (a) List the truth table for 3-variable XOR function

$Z = A \oplus B \oplus C$ (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 using minimum (i) NAND (ii) NOR gates. (9)

7. (a) Design a 4-bit magnitude comparator with three outputs : A > B, A < B and A = B. (7)

(b) Implement a BCD to seven segment converter. (8)