Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER–I • EXAMINATION – SUMMER • 2014

Subject Code: 610004 Date: 20-06-2014

Subject Name: Fundamentals of Computer Organization

Time: 10:30 am - 01:00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Answer the following. **07**

1. Perform binary addition of 10101 + 1110.01
2. Write the first 10 numbers in quaternary number system which has base or radix of 4.
3. Which are the different ways to represent –ve number in binary system compare with examples?
4. Convert 3116.9 to its equivalent 8421 BCD code.
5. Convert $(9AC)_{16}$ into GRAY code.
6. Find out the value of x , y $(204.62)_{10} = (x)_2 = (y)_8$
7. Why NAND gate is known as Universal GATE?

(b) Answer the Following.

1. Difference between True complement vs. Radix-minus-one complement **02**
2. Difference between Duality vs. Complement **02**
3. Explain DMA operations. **03**

Q.2 **(a)** Simplify using K-map F(w, x, y, z) = ∑(1, 2, 3, 5, 6,8,12,14,15) **07**

a) Find SOP expression
b) Simplify SOP expression
c) Implement this simplified expression using AND-OR gates
d) Implement this simplified expression only using NAND-NAND gates

(b) Perform multiplication with 9 * 8 showing contents of accumulator, B register and Y register during each step. (all are 5 bit registers) **07**

OR

(b) Answer the Following: **1.** Prove DeMorgan's law by perfect induction. **2+2+3**
2. Convert (A+B+D) (B'+BC) (A'+ C) into SOP form. **3.** Explain Cache memory in brief.

Q.3 **(a)** Explain half adder and construct full adder using half adder. **07**

(b) What is a Multiplexer? Explain 16-to-1 line multiplexer. **07**

OR

Q.3 **(a)** Define JK Flip-flop and Draw a set of waveform for J, K, Q and Q' flip-flop for following sequence of input signals: J : 0011 0101 1001 K : 1011 1000 1111 **07**

(b) Write a short note on Decoder using NAND gates. **07**

Q.4 **(a)** What is Asynchronous Data Transfer? Explain Handshaking method to implement it. **07**

(b) What is ROM? Explain different types of ROM. **07**

OR

Q.4 **(a)** Convert the expression (W* X)/(Y-Z) into postfix expression and then evaluate it for W=9, X=18, Y=13, Z =4. Display the stack after each operation. **07**

(b) Write a short note on BCD Counter. **07**

Q.5 **(a)** Write short note on Display unit. **07**

(b) Explain following Addressing modes.

1. Direct Addressing 2. Indirect Addressing 3. Index Addressing **2+2+3**

OR

Q.5 **(a)** Write a short note on different instruction format. **07**

(b) Explain Error detecting and correcting code using an appropriate example. **07**

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