

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 $F(w, x, y, z) = \sum(1, 2, 3, 5, 6, 8, 12, 14, 15)$ **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**
