Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER–I • EXAMINATION – WINTER • 2015

Subject Code: 610004 **Date: 01-01-2016**

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)** Perform following operations: **07**

i. $(1001.1)_2 + (1011.01)_2 = (\_\_\_\_\_)_2$

ii. $(2479)_{10} = (\_\_\_\_\_)_{16}$

iii. Convert binary number 110010 to its equivalent gray code.

iv. $(7)_8 + (14)_8$

v. Write first 12 numbers in base 4 (or quaternary) number system.

vi. Subtraction of 28.5 - 23.4 using 9's complement.

vii. Convert 3425.4 to its equivalent 8421 BCD code.

(b) Perform 12 * 9 and show the contents of the registers in each step. **07**

Q.2 **(a)** Do as Directed: **04**

i. Simplify the following Boolean algebra expression using Boolean algebra laws and draw a block diagram of the circuit using AND and OR gates.
A'B'C' + AB'C' +A'BC +A'B'C

ii. State the De Morgan's Law for three variables in both the forms and give the proof for one by the method of perfect induction. **03**

(b) Simplify following Boolean functions using 4-variable K-map: **07**
F(A,B,C,D) = Σ m (3,7,11,13,14,15) + d (2, 5) to the simplest possible SOP form and implement them using AND-OR Network and NAND -NAND Network.

OR

(b) What is Decoder ? Explain 3-to-8 line Decoder . **07**

Q.3 **(a)** Write a short note on 4-bit Binary Counter. **07**

(b) What is a flip-flop? Explain RS & JK flip-flop in detail. **07**

OR

Q.3 **(a)** Design and explain Full Adder Circuit. **07**

(b) Explain handshaking in Asynchronous Data Transfer. **07**

Q.4 **(a)** Explain Three, Two, One and Zero address instruction formats in detail. **07**

(b) Explain Direct, Indirect and Index addressing modes. **07**

OR

Q.4 **(a)** Convert the following numerical arithmetic expression into reverse Polish notation and show the stack operations for evaluating the numerical result. **07**
(3 + 6) x[10 x (2 + 8) + 10]

(b) Explain the design of 8-to-1 line Multiplexer. **07**

Q.5 **(a)** i. What is Cache memory? **02**

ii. Write a note on Magnetic Storage Devices. **05**

(b) Write a short note on Scanner. **07**

OR

Q.5 **(a)** i. What is Virtual memory? Discuss in brief. **02**

ii. Explain DMA. **05**

(b) Write a short note on different types of Printer. **07**

****