

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. $(1001.1)_2 + (1011.01)_2 = (\quad)_2$
 - ii. $(2479)_{10} = (\quad)_{16}$
 - 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**
 $F(A,B,C,D) = \sum m(3,7,11,13,14,15) + d(2, 5)$ 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**
 $(3 + 6) \times [10 \times (2 + 8) + 10]$
- (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**
