

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA– SEMESTER –I EXAMINATION –SUMMER-2019

Subject Code: 3610004

Date: 21-05-2019

Subject Name: Fundamentals of Computer Organization

Time: 02.30 pm to 5.00 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 questions: **07**
1. Explain basic duality of Boolean algebra.
 2. Convert $(1001011)_2$ into gray code.
 3. What is self-complementary code?
 4. Write De-Morgan's Law.
 5. Define Subcube.
 6. Differentiate RAM and ROM.
 7. Write basic symbols of Quinary number system.
- (b)** Answer the Following Questions: **07**
1. $(1762.46)_8 = (\text{_____})_2$
 2. $(10011100)_2 = (\text{_____})_{10}$
 3. $(1010.101)_2 + (110.01)_2 = (\text{_____})$
 4. _____ are the weights of the BCD number.
 5. $(111010001)_2 = (\text{_____})_{16}$
 6. Complement of $(xy + x'y')$ = _____
 7. Gray code $1101110 = (\text{_____})_2$
- Q.2 (a)** What is a computer? Explain major components of a digital computer. **07**
- (b)** Write a short note on Peripheral devices. **07**
- OR**
- (b)** Write a note on Magnetic storage devices. **07**
- Q.3 (a)** Write a note on 3 bit asynchronous binary counter. **07**
- (b)** Explain 1-bit binary Full Adder in detail. **07**
- OR**
- Q.3 (a)** Write a note on Multiplexer **07**
- (b)** What is a sequential logic circuit? Explain it with a 3 bit shift register. **07**
- Q.4 (a)** What do you mean by addressing techniques? Explain Indirect and Indexed addressing techniques with proper examples. **07**
- (b)** Explain Instruction cycle and Execution cycle in detail. **07**
- OR**
- Q.4 (a)** Explain Immediate addressing, Direct addressing and Register addressing techniques. Also compare them with appropriate examples. **07**
- (b)** List three different types of bus and explain how three state drivers are used in the interfaces of buses. Also draw timing signals for asynchronous transfer. **07**
- Q.5 (a)** 1. $ABCD + A'BC'D' + A'BC'D + A'BCD'$. Simplify without using K-Map and draw a combinational network using NAND gate only. **03**
- 04**

2. Draw k-map for: $ABC + ABC + ABC + ABC + ABC$ (consider last three terms as Don't-cares terms) and simplify the expression. Draw the circuit diagram for the expression using only NAND gates.
- (b) Explain Execution Unit of 8086 microprocessor in detail with appropriate diagram. **07**

OR

- Q.5** (a) Explain following instructions of 8086 microprocessor: **07**
CMP , XOR , NEG , SUB , INC , NOT , AND
- (b) 1. De Morganize the given Boolean expression: **03**
 $[((A+B)' \cdot (C+D)')' \cdot ((E+F)' \cdot (G+H)')]'$
2. Simplify the Boolean function $F(A,B,C,D) = \pi(0,2,4,6,8,10,12,14)$, using **04**
K-Map and draw a combinational logic circuit
