Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**MCA - SEMESTER–I • EXAMINATION – WINTER • 2014**

**Subject Code: 610004 Date: 01-01-2015**

**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)**

1. Prepare truth table for the following Boolean expressions: **02**
   a. ABC + A'B' + A'C'
   b. A'B + A'C + B'C
2. Simplify the following expression: ABC + A(CD + CD`) **01**
3. Give the dual for the following Boolean expression:
   a. XY'Z + X'Y' + Y'Z **02**
   b. AB + A'B'
4. Draw K-map for: **02**
   a. m0 + m2 + m6 + m7 (K-map in X,Y,Z)
   b. m1 + m2 + m3+ m6 + m7 + m9 + m11 + m13 + m15 (K-map in A,B,C,D)

**(b)** Perform the following operations:

1. Represent decimal number 5347 in BCD format. **01**
2. 1101 – 1010 (Using 2's complement) **01**
3. Convert the hexadecimal number CB9 to binary and octal **02**
4. Perform binary multiplication 16 * 8 **02**
5. Perform octal addition: 126 + 546 **01**

**Q.2** **(a)**

1. Explain various components of ALU in brief. **03**
2. Write a short note various addressing modes **04**

**(b)**

1. Explain the various peripheral devices **04**
2. Write a short note on Read Only Memory **03**

**OR**

**(b)**

1. Explain in detail any one printer. **04**
2. Write a short note on Random Access Memory **03**

**Q.3** **(a)** Write a short note on 8 x 1 Multiplexer **07**

**(b)** Briefly explain the working of Half-Adder and Full-Adder along with the circuit diagrams. **07**

**OR**

**Q.3** **(a)** Write a short account on 3 to 8 Decoder **07**

**(b)** Write a short note on Parallel Binary Adder **07**

**Q.4** **(a)** Write a brief account on JK Flip Flop. **07**

**(b)** Simplify the Boolean function in sum-of-products form by means of a 4-variable map. Draw the logic diagram with (a) AND-OR gates (b) NAND-NAND gates **07**

$F(A,B,C,D) = \sum (0,1,4,5,10,11,14,15)$

**OR**

**Q.4** **(a)** Write a short account on RS Flip Flop. **07**

| | | | |
|---|---|---|---|
| **Q.4** | **(b)** | Simplify the Boolean function in product-of-sums form by means of a 4-variable map. Draw the logic diagram with (a) OR-AND gates (b) NOR-NOR gates<br>$F(A,B,C,D) = \prod (0,2,4,6,7,8,9,12,14)$ | **07** |
| **Q.5** | **(a)** | Explain the basic architecture of 8086 microprocessor in context of Bus Interface Unit and Execution Unit | **07** |
| | **(b)** | Explain Binary up and down counter. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Explain Binary Coded Decimal Adder | **07** |
| | **(b)** | Explain Ripple Counter | **07** |

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