

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. $m_0 + m_2 + m_6 + m_7$ (K-map in X,Y,Z)
 b. $m_1 + m_2 + m_3 + m_6 + m_7 + m_9 + m_{11} + m_{13} + m_{15}$ (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 **07**
 $F(A,B,C,D) = \prod (0,2,4,6,7,8,9,12,14)$
- Q.5 (a)** Explain the basic architecture of 8086 microprocessor in context of Bus Interface **07**
Unit and Execution Unit
- (b)** Explain Binary up and down counter. **07**
- OR**
- Q.5 (a)** Explain Binary Coded Decimal Adder **07**
- (b)** Explain Ripple Counter **07**
