

GUJARAT TECHNOLOGICAL UNIVERSITYM. C. A. Semester - IST Examination –July- 2011

Subject code: 610004

Subject Name: Fundamentals of Computer Organization

Date: 11/07/2011

Time: 02:30 pm – 05:00 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. Simplify the following expression using Boolean Algebra: $AB + A(CD + CD')$ **01**
 2. List the truth table of the function: **02**
 $F = xy'z + x'y' + xy$
 3. Determine by means of a truth table the validity of DeMorgan's theorem for three variables: **02**
 $(ABC)' = A' + B' + C'$
 4. Draw K-map for:
 - a. $m_0 + m_1 + m_4 + m_7$ (K-map in X,Y,Z) **01**
 - b. $m_2 + m_3 + m_5 + m_6 + m_7 + m_9 + m_{11} + m_{13}$ (K-map in A,B,C,D) **01**
- (b)** Perform the following operations:
1. $11011 - 11001$ (Using 2's complement) **01**
 2. Represent decimal number 1246 in BCD format. **01**
 3. Convert the hexadecimal number AB4 to binary and octal **02**
 4. Write the first 12 numbers in the base 4 number system. **01**
 5. Perform $1101.11 * 11.1$ **01**
 6. Perform $11001 \div 101$ **01**
- Q.2 (a)**
1. Give characteristic table and the circuit diagram for RS Flip Flop. **03**
 2. Write a short note various addressing modes **04**
- (b)**
1. Write a short note on Read Only Memory **03**
 2. Explain the various peripheral devices **04**
- OR**
- (b)**
1. Write a short note on Random Access Memory **03**
 2. Explain in detail printers **04**
- Q.3 (a)** Briefly explain the working of Half-Adder and Full-Adder along with the circuit diagrams. **07**
- (b)** Write a short account on 4 X 1 Multiplexer **07**
- OR**
- Q.3 (a)** Write a short note on Parallel Binary Adder **07**
- (b)** Write a short account on 3 to 8 Decoder **07**
- Q.4 (a)** Design a counter using JK Flip Flop which counts 0,7,3,2,5 repeat **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**
 $F(A,B,C,D) = \sum (0,2,8,9,10,11,14,15)$

OR

- Q.4 (a)** Design a counter using RS Flip Flop which counts 0,2,4,6,7 repeat **07**
(b) Simplify the Boolean function in product-of-sums form by means of a 4-**07**
variable map. Draw the logic diagram with (a) OR-AND gates (b) NOR-
NOR gates
 $F(W,X,Y,Z) = \sum(2,3,4,5,6,7,11,14,15)$

- Q.5 (a)** Explain how to divide 13 by 3 in the registers and showing how the quotient **07**
and remainder are placed after the division. (all are 5 bit registers)
(b) Explain Binary up and down counter. **07**

OR

- Q.5 (a)** Explain Binary Coded Decimal Adder **07**
(b) Explain how to multiply 1001 with 1101 in the register. (All are 5 bit **07**
registers.)
