No. of Printed Pages : 3 **BICS-009**

01445

B.TECH. IN COMPUTER SCIENCE AND ENGINEERING (BTCSVI)

Term-End Examination

June, 2012

BICS-009 : LOGIC DESIGN

Time : 3 hours *Maximum Marks : 70*

*Note : Attempt **any seven** questions. All questions carry **equal** marks.*

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1. (a) Implement the given boolean function using only NAND gates 5

$F = A(CD + B) + B\overline{C}$

(b) Simplify and find the minimal SOP and POS circuit for the boolean function : 5

$F(A, B, C, D) = \Sigma m\ (6, 8, 9, 10, 11, 12, 13, 14, 15)$

2. (a) Simplify the following Boolean function using Quine Mc Clusky method 6

$f\ (x_1, x_2, x_3, x_4) = \Sigma m\ (0, 5, 7, 8, 9, 10, 11, 14, 15)$

(b) Realize $Y = \overline{A}B + \overline{B}\ \overline{C} + ABC$ using an 8:1 multiplexer. 4

3. (a) Explain programmable Array Logic. 5

(b) Design a 1 bit binary magnitude comparator. 5

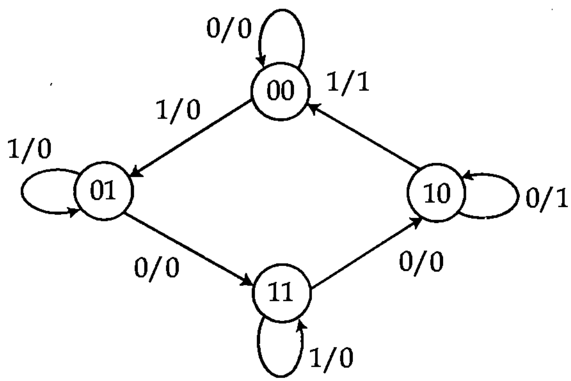
4. (a) Add $+39$ and -22 in 2's complement method. 4

(b) Design a full adder using two half adders. 6

5. (a) Explain Schmitt Trigger transfer characteristic. 5

(b) Convert a T - flipflop to D - flipflop. 5

6. (a) For the given state diagram, draw the clocked sequential circuit using T - flipflops. 6



(b) Explain serial in serial out shift register. 4

7. (a) Design a synchronous 3 bit binary up counter using T - flipflop. 6

(b) Explain a 4 bit ring counter using D - flipflop. 4

8. (a) What are the problems faced in asynchronous sequential circuits ? 5

(b) An asynchronous sequential circuit is described by the excitation function : 5

$y = x_1\bar{x}_2 + x_1 y$ and output function

$z = x_1 x_2 y$

(i) Draw the logic diagram of circuit.

(ii) Derive the transition table and output map.

9. Write short notes on *any two* : 10

(a) A/D converter - counter method

(b) Dual slope A/D converter

(c) D/A converter using binary ladder

10. Write short notes on *any two* : 10

(a) Open collector TTL NAND gate

(b) 74COO CMOS NAND gate

(c) MOSFET as a switching circuit.