

Code: CS2T4, IT2T2

**I B.Tech-II Semester-Regular Examinations - July 2014****DIGITAL LOGIC DESIGN  
(Common for CSE, IT)**

Duration: 3 hours

Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) Convert the following to Decimal and then to Hexadecimal

(i)  $(743)_8$

(ii)  $(62103)_8$

(iii)  $(10111010)_2$

(iv)  $(11011101)_2$

8 M

b) State and prove De-Morgan's Laws.

6 M

2. a) Simplify the following Boolean functions algebraically

(i)  $(x+y)(x,+y)$

(ii)  $(A'+B')(A+B')$

(iii)  $AB'+A(C'D+CD')$

(iv)  $A'B+AB'C+ABC'$

8 M

b) Express the following functions in sum of minterms and product of maxterms

(i)  $F(A,B,C,D) = (A'B' + AC + BD' + C'D')$

(ii)  $F(x,y,z) = (x+y'z)(xy+z')$

6 M

3. a) Simplify the following Boolean function and draw the logic circuit using NOR gates only

$$F(A,B,C,D) = \sum(1,2,4,7,8,9,10,14) + d(3,6,11)$$

7 M

- b) Simplify the following Boolean function and draw the logic circuit using NAND gates only  
 $F(A,B,C,D) = \prod(0,2,4,5,6,7,8,10,13,15)$  7 M
4. a) Design a Half adder and draw the logic diagram. 4 M
- b) Design a Carry Look Ahead adder and draw the circuit diagram. 10 M
5. a) Construct 16X1 multiplexer using 4X1 multiplexers. 7 M
- b) Realize following Boolean function with 8X1 multiplexer  
 $F(A,B,C,D) = \sum(3,7,11,13,14,15)$  7 M
6. Draw and explain the block diagram of PLA  
 Tabulate the PLA programmable table for the four Boolean function  
 $A(x.y.z) = \sum m(2,4,6,7)$        $B(x.y.z) = \sum m(0,1,5,6,7)$   
 $C(x.y.z) = \sum m(1,3,5)$        $D(x.y.z) = \sum m(1,2,4,6)$   
 14 M
7. a) Draw the circuit diagram of clocked JK flip-flop and explain its operation. 7 M
- b) Draw the circuit diagram of clocked D flip-flop and explain its operation. 7 M
8. Design a mod -12 synchronous counter 14M