PVP 12

Code: **CS2T4, IT2T2**

## I B.Tech-II Semester-Regular Examinations - July 2013

# DIGITAL LOGIC DESIGN

**(For Computer Science & Engineering, Information Technology)**

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) $(576)_8$ (ii) $(4053)_8$
   (iii) $(11011011)_2$ (iv) $(10111101)_2$ 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(CD+CD') (iv) A'B+ABC'+ABC 8 M

   b) Express the following functions in sum of minterms and product of maxterms
   (i) F(A,B,C,D) = (AB + AC' +B'D + CD')
   (ii) F(x,y,z) = (x+yz)(xy+z) 6 M

3. a) Simplify the following Boolean function and draw the logic circuit using NOR gates only
   $F(A,B,C,D) = \sum(0,1,2,3,7,8,10) + d(5,6,11,15)$ 7 M

b) Simplify the following Boolean function and draw the logic circuit using NAND gates only

$F(A,B,C,D) = \prod(2,3,4,5,7,11,14,15)$ 7 M

4. a) Design a Full adder and draw the logic diagram. 7 M

b) Design a Full subtractor and realize the logic circuit. 7 M

5. a) What is a multiplexer? Draw 4X1 Multiplexer and explain. 7 M

b) Design a BCD to Excess-3 code converter. 7 M

6. Draw and explain the block diagram of PLA.
Tabulate the PLA programmable table for the four Boolean functions

$A(x,y,z) = \sum m(0,2,3,5,7)$
$B(x.y.z) = \sum m(0,1,4,6)$
$C(x,y,z) = \sum m(1,4,6)$
$D(x,y,z) = \sum m(0,2,3,7)$ 14 M

7. a) Draw the circuit diagram of clocked SR flip-flop and explain its operation. 7 M

b) Draw the circuit diagram of clocked T flip-flop and explain its operation. 7 M

8. Design a mod -10 synchronous counter. 14 M