

Code: EC4T3

II B.Tech - II Semester – Regular Examinations - JUNE 2014**SWITCHING THEORY & LOGIC DESIGN
(ELECTRONICS AND COMMUNICATION ENGINEERING)**

Duration: 3 hours

Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) Convert the following into required bases 8 M

i) $(1101011.101)_2 = (\quad)_{10}$

ii) $(DCE.E)_{15} = (?)_{10}$

iii) $(AB. CD)_{16} = (?)_8$

iv) $(234. 52)_6 = (?)_7$

b) Simplify the following: 6 M

i) $((AB)'(CD+E'F)((AB)'+(CD)'))'$

ii) $A'B(D'+C'D) + B(A+A'CD)$

2. a) Implement only by NAND gates

$$F = (a + b')(cd + e')$$
 6 M

b) Simplify

$$ABCD' + A + ABD' + D'(A'B'C')$$
 4 M

c) If $(AB)' + A'B = C$, then $(AC)' + A'C = ?$ 4 M3. a) For the function $F(w,x,y,z) = \sum m(2,3,4,5,6,7,11,13,15)$
perform the following 7 M

- i) Find the minimized expression using k-maps
- ii) Find Prime Implicants and Essential Prime Implicants
- iii) Implement it using gates.

b) Simplify the given expression using k-maps and implement the following using universal gates 7 M

$$F = \sum m(0,1,2,3,4,5,6,7) + d(8,9,10,11)$$

4. a) Implement $F(A,B,C,D) = \sum m(0, 1, 5, 7, 10, 14, 15)$ using a 8x1 multiplexer. 7 M

b) Implement $F(A,B,C,D) = \sum m(0, 1,5,7,10,14,15)$ using a 3 to 8 decoder. 7 M

5. a) Write PLA programming table and implement 10 M
 $A(x,y,z) = \sum m(1, 2, 4, 6)$; $B(x,y,z) = \sum m(0, 1, 6, 7)$

b) Difference between PLA, PAL, PROM. 4 M

6. a) The truth table for AB FF is shown. Draw schematic diagram using JK-FF & any additional logic to implement it. Show the design steps. 8 M

A_n	B_n	Q_{n+1}
1	1	0
0	1	1
1	0	Q_n
0	0	Q_n'

b) Design a mod-4 upcounter and draw its corresponding waveforms 6 M

7. a) A synchronous sequential machine has a single control input x & the clock, and two outputs A & B . On consecutive rising edges of the clock, the code on A & B changes from 00 to 01 to 10 to 11 and repeats itself if $x=1$; if at any time, $x=0$, it holds to the present state. Draw the state diagram & implement the circuit using T-FF. 10 M
- b) Explain the differences between mealy and Moore machines. 4 M
8. a) Discuss about hazards in combinational circuits 7 M
- b) Eliminate hazard in the function $F = xz' + yz$ 7 M