디지털 공학 (MEC520)
Midterm Examination

Spring, 2010

1. Reduce the following Boolean expression to the indicated number of literals, using Boolean algebra. (10 pt each)
   a) $(x'y'+z)'+z+xy+wz$ to three literals
   b) $(A+B)'(A'+B')'$ to one literals

2. Simplify the following Boolean expressions, using four-variable maps. (10 pt each)
   a) $wxy+yz+xy'z+x'y$
   b) $B'D+A'BC'+AB'C+ABC'$

3. Simplify the following functions in product of sums. (10 pt each)
   a) $F(w,x,y,z)=\sum(0,2,5,7,8,10)$
   b) $F(A,B,C,D)=\prod(1,3,5,7,13,15)$

4. Simplify the following Boolean Function F, together with the don't care conditions d, and then express the simplified function in sum of minterms. (10 pt each)

   a) $F(A,B,C,D)=\sum(0,6,8,13,14)$
      $d(A,B,C,D)=\sum(2,4,10)$

   b) $F(A,B,C,D)=\sum(1,3,5,7,9,15)$
      $d(A,B,C,D)=\sum(4,6,12,13)$

5. Below is the truth table for converting binary sum to BCD sum. Find the Boolean function of carry (C) . (20 pt each)

Binary Sum					BCD Sum					Decimal
K	Z_8	Z_4	Z_2	Z_1	C	S_8	S_4	S_2	S_1	
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	1	1
0	0	0	1	0	0	0	0	1	0	2
0	0	0	1	1	0	0	0	1	1	3
0	0	1	0	0	0	0	1	0	0	4
0	0	1	0	1	0	0	1	0	1	5
0	0	1	1	0	0	0	1	1	0	6
0	0	1	1	1	0	0	1	1	1	7
0	1	0	0	0	0	1	0	0	0	8
0	1	0	0	1	0	1	0	0	1	9
0	1	0	1	0	1	0	0	0	0	10
0	1	0	1	1	1	0	0	0	1	11
0	1	1	0	0	1	0	0	1	0	12
0	1	1	0	1	1	0	0	1	1	13
0	1	1	1	0	1	0	1	0	0	14
0	1	1	1	1	1	0	1	0	1	15
1	0	0	0	0	1	0	1	1	0	16
1	0	0	0	1	1	0	1	1	1	17
1	0	0	1	0	1	1	0	0	0	18
1	0	0	1	1	1	1	0	0	1	19

디지털 공학 (MEC520)
Midterm Examination

Spring, 2010

학번_____ 이름_____