11-4-02

EE 220
LOGIC
DESIGN

SPRING 2002
TEST 1
50 MINUTES

NDU
EE& CCE DEPARTMENT
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NOTE1: OPEN BOOK, CLOSED NOTES.
NOTE2: SHOW ALL WORK IN ORDER TO RECEIVE FULL CREDIT

1. 10P. Perform the base conversions indicated below:

$(521.8125)_{10}$ = ( )$_8$ = ( )$_{16}$ = ( )$_2$

$(383.3125)_{10}$ = ( )$_8$ = ( )$_{16}$ = ( )$_2$

2. 15P. Using two's complement arithmetic, perform the following subtractions:

$(1101011.10)_2 - (1010.11)_2$

$(3467.7)_8 - (ADF.C)_{16}$

3. 10P. Use Boolean Algebra to simplify the following expression to minimum number of literals Indicate law used at each step.

F(w,x,y,z) = x + xyz + x'y z + wx + w'x + x'y

4. 35Pts. Which of the four-variable functions are equivalent? Justify your answer.

F_1 = A'B + BD + BC + A'CD' + A'C'D' + A'BC' + A'BCD' + ABCD'

F_2 = ((BC')'(BC)'(BD)'(AB)'(A'B)'(ACD')'(A'C'D')')'

$F_3 = \Sigma$ m(2,4,5,6,7,8,12,13,14,15)

F_4 = AB ⊕ A'B ⊕ AB'C' ⊕ AB'C'D ⊕ A'B'CD'

$F_5 = \Pi$ M(1,2,3,8,9,11)

F_6 = ((A'+B+C)' + (A'+B+D')' + (A+B+C')' +(A+B+D')')'

5. 15 Pts. Find the minimum product of sums for:

$F(a,b,c,d,e) = \Sigma\, m(1,2,3,4,5,6,25,26,27,28,29,30,31)$

6. 15 Pts Find the minimum sum of products for:

$G = C'E'F + DEF + AD'E'F' + BC'E'F + AD'EF'$