EE 220   SPRING 2002   NDU
LOGIC   TEST 1   EE& CCE DEPARTMENT
DESIGN   50 MINUTES   S. C. ELMURR

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.

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

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

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

$F_4 = AB \oplus A'B \oplus AB'C' \oplus AB'C'D \oplus A'B'CD'$

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

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

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:

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