

디지털 공학 (MEC520)
Midterm Examination

Spring, 2007

1. Perform the following subtraction using the 2's complement after converting the decimal numbers to binary numbers. (10 pt)

$$36 - 63.6875$$

2. Reduce the following Boolean expression to the indicated number of literals. (10 pt each)
- a) $(x'y' + z)' + z + xy + wz$ to three literals
 - b) $A'B(D' + C'D) + B(A + A'CD)$ to one literal
3. Find the possible combinations of the essential prime implicants of the following Boolean functions. (10 pt each)
- a) $F(w, x, y, z) = \sum(0, 2, 4, 5, 6, 7, 8, 10, 13, 15)$
 - b) $F(A, B, C, D) = \sum(1, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15)$
4. 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) $F(A, B, C, D) = \prod(1, 3, 5, 7, 13, 15)$
 - c) $F(x, y, z) = x'z' + y'z' + yz' + xy$ (Use only K-map, do not use algebraic manipulation)
5. 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) $F(A, B, C, D) = \sum(1, 3, 5, 7, 9, 15)$
 $d(A, B, C, D) = \sum(4, 6, 12, 13)$

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학번 _____

이름 _____