COE 202- Term 053
Assignment #2

Q.1 (20 points)

Represent the following negative numbers in binary in 1s and 2s complement on 16 bits.

- $- (234)_{10}$
- $- (756)_8$
- $- (D5A)_{16}$
- $- (2367)_{10}$
- $- (534)_{10}$

Q.2 (20 points)

Prove the following identities using Boolean algebraic manipulations:

a. $x'y' + xy + x'y = x' + y$
b. $xy + x'z + y'z = xy + z$
c. $x'yz + x'yz' + xy'z' + xy'z = x'y + xy'$
d. $x'y + x'z + x'y' + x'yz' = x'$

Q.3 (20 points)

Draw schematics for the following functions in terms of AND, OR, and inverter gates.

- $x (y + z)$
- $xy + xz$
- $\overline{x (y + z)}$
- $\overline{x} + \overline{yz}$
- $x (y + zt)$

Q.4 (20 points)

Simplify the following Boolean functions

- $F(x,y,z) = m(0,1,5,7)$
- $F(x,y,z,t) = m(0,2,3,4,6,8,9,B,E,F)$
- $F(x,y,z,t) = M(1,2,4,5,8,9,A,B)$
- $F(x,y,z,t) = M(0,1,3,4,6,A,C,D)$

Q.5 (20 points)

Consider the following function:

$$F(A,B,C,D) = (A + C')(A + D)(A' + B)(B' + D')$$

a. Write the function as a sum of minterms. Specify the minterms (using m_i notation)
b. Write the function as a product of maxterms. Specify the maxterms (using M_i notation)
c. Simplify the function.
d. Write the simplified function as a reduced sum of products