EC 2.101 - Digital Systems and Microcontrollers

Practice Sheet 1 (Lec 1 – Lec 7)

Q1. Base Conversions

    a. $(8567)_9$ into base 4.
    b. $(A6548)_{16}$ into base $8, 4$ and 2.
    c. $(868)_{10}$ into BCD and $(100000100001010001101010)_{BCD}$ into decimal.
    d. $(10110.0101)_2, (16.5)_{16}, (26.24)_8, (DADA.B)_{16}$ into decimal.

Q2. Complements

Perform the calculations assuming the binary numbers are in signed 2's complement representation (Convert the remaining before addition).

    a. $(-7634)_8 + (-512)_{10} + (+4AF)_{16} + (011001100110)_2$ [16 – bit]
    b. $(+657)_9 + (-565)_7 + (100001000101)_{BCD} + (1101010110)_2$ [12 – bit]
    c. $(1000100101010111)_{BCD} + (+7345)_8 + (4FB)_{16}$ [16 – bit]

Q3. Boolean Expressions

    a. Show that the dual of $(xy' + x'y)$ is equal to its complement.
    b. Simplify the following expressions.
        i. $x'y + yz + xz' + x'y' + xyz'$
        ii. $xyz + x'y'z + xy'z + xz + xzy'$
        iii. $xy + xy' + x'y'z + xy'z' + xyz$
        iv. $x'y + x'y'z + xyz' + xy + xy'z'$