Assignment-2

[1]. Obtain the 1's and 2's complements of the following binary numbers:
(i) 00010000
(ii) 11011010
(iii) 10101010
(iv) 10000101
(v) 11111111.

[2]. Find the 9's and the 10's complement of the following decimal numbers:
(i) 25,478,036
(ii) 63, 325, 600
(iii) 25,000,000
(iv) 00,000,000.

[3]. Perform subtraction on the given unsigned binary numbers using the 2's complement of the subtrahend. Where the result should be negative, find its 2's complement and affix a minus sign.
(i) 10011- 10010 (ii) 100010 - 100110
(iii) 1001 - 110101 (iv) 101000 - 10101

[4]. Perform subtraction on the given unsigned numbers using the 10's complement of the subtrahend. Where the result should be negative, find its 10's complement and affix a minus sign. Verify your answers.
(i) 4,637 - 2,579
(ii) 125 - 1,800
(iii) 2,043 - 4,361
(iv) 1,631 – 745

[5]. List the theorems and postulates of most basic relationships in Boolean.

[6]. Reduce the following Boolean expressions to the indicated number of literals:
(a) $A'C' + ABC + AC'$ to three literals
(b) $(x'y' + z)' + z + xy + wz$ to three literals
(c) $A'B(D' + C'D) + B(A + A'CD)$ to one literal
(d) $(A' + C)(A' + C')(A + B + C'D)$ to four literals
(e) $ABC'D + A'BD + ABCD$ to two literals

[7]. Obtain the truth table of the following functions, and express each function in sum-of-minterms and product-of-maxterms form:
(i) (b + cd)(c + bd)
(ii) (cd + b' c + bd')(b + d)
(iii) (c' + d)(b + c')
(iv) bd' + acd' + ab' c + a'c'

[8]. Draw logic diagrams of the circuits that implement the original and simplified expressions

[9]. Draw the logic diagram corresponding to the following Boolean expressions without simplifying them:
(i) BC’ + AB + ACD
(ii) (A + B)(C + D)(A’ + B + D)
(iii) (AB + A’B’)(CD’ + C’D)
(iv) A + CD + (A + D')(C' + D)

[10]. Draw logic diagrams of the circuits that implement the original and simplified expressions
(i) $xy + xy'$ (ii) $(x + y)(x + y')$
(iii) $xyz + x'y + xyz'$ (iv) $(A + B)'(A' + B')'$
(v) $(a + b + c')(a' b' + c)$ (vi) $a'bc + abc' + abc + a'bc'$