Assignment 2

Total: 50
Deadline: March 3, 2025

This assignment must be hand-written. Show ALL steps in ALL questions.

1. [5 Marks] **Simplify** the following boolean expression:
   (A + B) (A+B)(A+C)

2. [5 Marks] **Find** the complement of the following expression:
   (x' + y + z')(x' + y')(x + z')

3. [5 Marks] **Draw** the following functions using NAND gates only:
   F(A,B,C,D) = (A'B'CD' + A'D + (B+D'))
   NB: You can't simplify the above function. You have to draw based on the function given in question.

4. [5 Marks] **Draw** the following functions using NOR gates only:
   F(A,B,C,D) = (AB'C'D' + AD + (B+D'))
   NB: You can't simplify the above function. You have to draw based on the function given in question.

5. [5 + 5 + 5 Marks] **Find** out Canonical SOP and POS for the following: (Do not use truth table)
   a. F(A,B,C) = AB+BC'
   b. F(A,B,C,D) = A+ B'CD'
   c. F(A,B,C,D,E) = AB+CDE

6. [5 Marks] **Simplify** the following boolean equation using the laws of boolean algebra and implement the simplified function using only NOR gates:
   $F(a,b,c,d) = \sum(8, 9, 10, 11, 13, 15)$

7. [5 + 5 Marks] **Simplify** the following boolean equation using the laws of boolean algebra and implement the simplified function using only NAND gates:
   a. $F(a,b,c,d) = \sum(8, 9, 0, 11, 7, 15)$
   b. $F(a,b,c,d) = \sum(5, 8, 9, 12, 15)$