CMPUT 329 Honor Code

StudentID: Name:

Problem 1
Using NERD, DESIGNER, FAILURE, and STUDIED, write a boolean expression that is 1 for successful designers who never studied and for nerds who studied all the time

Problem 2
Use the theorems of switching algebra to simplify each of the following logic functions:

a. $F = W \cdot X \cdot Y \cdot Z \cdot (W \cdot X \cdot Y \cdot Z' + W \cdot X' \cdot Y \cdot Z + W' \cdot X \cdot Y \cdot Z + W \cdot X \cdot Y' \cdot Z)$

b. $F = A \cdot B + A \cdot B \cdot C' \cdot D + A \cdot B \cdot D \cdot E' + A \cdot B \cdot C' \cdot E + C' \cdot D \cdot E$

c. $F = M \cdot N \cdot O + Q' \cdot P' \cdot N' + P \cdot R \cdot M + Q' \cdot O \cdot M \cdot P' + M \cdot R$

Problem 3
Write the canonical sum and product for each of the following logic functions:

a. $F = \sum_{X,Y}(1,2)$

b. $F = \sum_{A,B,C}(2,4,6,7)$

c. $F = X + Y' \cdot Z'$

d. $F = \prod_{A,B}(0,1,2)$

e. $F = \prod_{W,X,Y}(0,1,3,4,5)$

f. $F = V' + (W' \cdot X)'$

Problem 4
Use a Karnaugh Map to find the minimal sum-of-products expression for each of the following logic functions:

a. $F = W \cdot X \cdot Z' + W \cdot X' \cdot Y \cdot Z + X \cdot Z$

b. $F = (X' + Y') \cdot (W' + X' + Y) \cdot (W' + X + Z)$

c. $F = A \cdot B \cdot C' \cdot D' + A' \cdot B \cdot C' + A \cdot B \cdot D + A' \cdot C \cdot D + B \cdot C \cdot D'$

d. $F = \sum_{V,W,X,Y,Z}(0,1,2,3,4,5,10,11,14,20,21,24,25,26,27,28,29,30)$

e. $F = \sum_{V,W,X,Y,Z}(0,2,4,6,7,8,10,11,12,13,14,16,18,19,29,30)$

f. $F = \prod_{V,W,X,Y,Z}(4,5,10,12,13,16,17,21,25,26,27,29)$

g. $F = \sum_{V,W,X,Y,Z}(4,6,7,9,11,12,13,14,15,20,22,25,27,28,30) + d(1,5,29,31)$

h. $F = \prod_{a,b,c,d}(0,2,4,6,) \cdot d(3,8,14)$