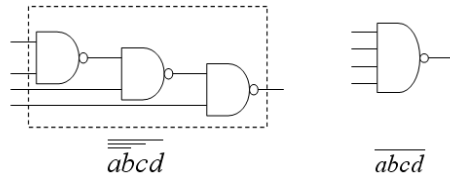


## CSC 405 Sample Test

Name \_\_\_\_\_ Grade \_\_\_\_\_

*This is an open-book (what @#!%#!!! book???) , open-note test. Do not share resources with anyone. Partial credit is possible, so show all work. If you have any questions please ask the instructor. Good luck.*

1 Show whether the NAND gate can be cascaded. You may use a truth table or algebraic manipulation in your derivation.



2 Compute the maximum safe current permitted in each of the following 1/4 watt resistors:

a. 10 $\Omega$	
b. 1K $\Omega$	

3 Compute the power dissipated by each resistor above when connected to a 5 Volt supply.

4 Sketch a 4-input AND circuit made from 2-input AND gates that has a minimum depth-of-circuit.

5 Use K-maps to simplify the following expressions.

- a.  $F(w,x,y,z) = wx'yz + wxy'z + wxyz + wx'y'z$       b.  $F(w,x,y,z) = wx + wy + wz + yz + wz$   
 c.  $F(w,x,y,z) = (w'+x+y+z)(w+x+y'+z)(w+x+y+z')$       d.  $F(w,x,y,z) = (wx + w'yz)(z' + w'y)$

6 Simplify the Boolean expressions of problem 5 algebraically.

7 Give the canonical SOP and POS forms for the Boolean expressions of 5.

8 Sketch the K-map for a 4-input XOR logic gate.