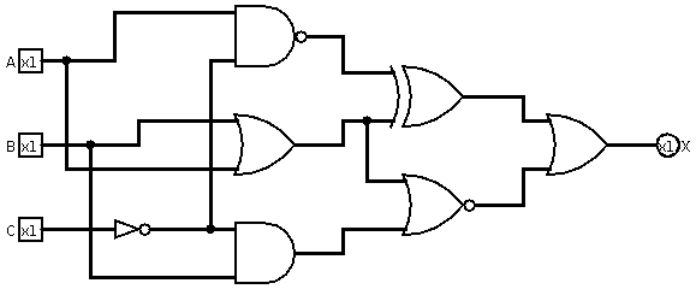
Name: _____

Write all of your responses on the extra paper provided. Hand in this exam paper along with your solutions, please place your name on the top of each page. Show all of your work.

NO CALCULATION DEVICES ARE ALLOWED FOR THIS EXAM!

1. (10 Points) Convert $(3673)_{10}$ to bases, $r = 2$, $r = 5$, and $r = 16$.
2. (10 Points) Convert $(36.7)_{10}$ to bases, $r = 2$, $r = 3$, and $r = 16$.
3. (5 Points) Convert the binary number 11100110.01001 to octal and hexadecimal.
4. (5 Points) Convert the hexadecimal number C23A.4E to binary and octal.
5. (10 Points) Take the two binary numbers $a = 110010011$ and $b = 1001000111$ and calculate $a + b$, $b - a$, and $a \cdot b$, using binary arithmetic.
6. (10 Points) Take the two hexadecimal numbers $a = 7A34$ and $b = BAD$ and calculate $a + b$, and $a - b$, using hexadecimal arithmetic.
7. (5 Points) Find the 1's and 2's complement of $(114)_{10}$, using byte storage with one sign bit.
8. (5 Points) Convert $(61)_{10}$ to binary and then using the 2's complement of $(114)_{10}$ and addition, calculate $61 - 114$ in binary form.
9. (50 Points) Do the following for the circuit below.



   (a) Construct the truth table for the circuit.
   (b) Write the circuit's logical function in canonical SOP form.
   (c) Write the circuit's logical function in canonical POS form.
   (d) Write the circuit in minterm form.
   (e) Write the circuit in maxterm form.
   (f) Write the K-Map for the circuit, show the groupings you would use, and then construct the minimized logical circuit function in both SOP form and POS form.
   (g) Using the K-Map work, write the circuit diagram of the minimized circuit.
   (h) Do the Quine-McCluskey procedure on the original circuit, show all steps in the derivation. Construct the minimized logical circuit function in SOP form.