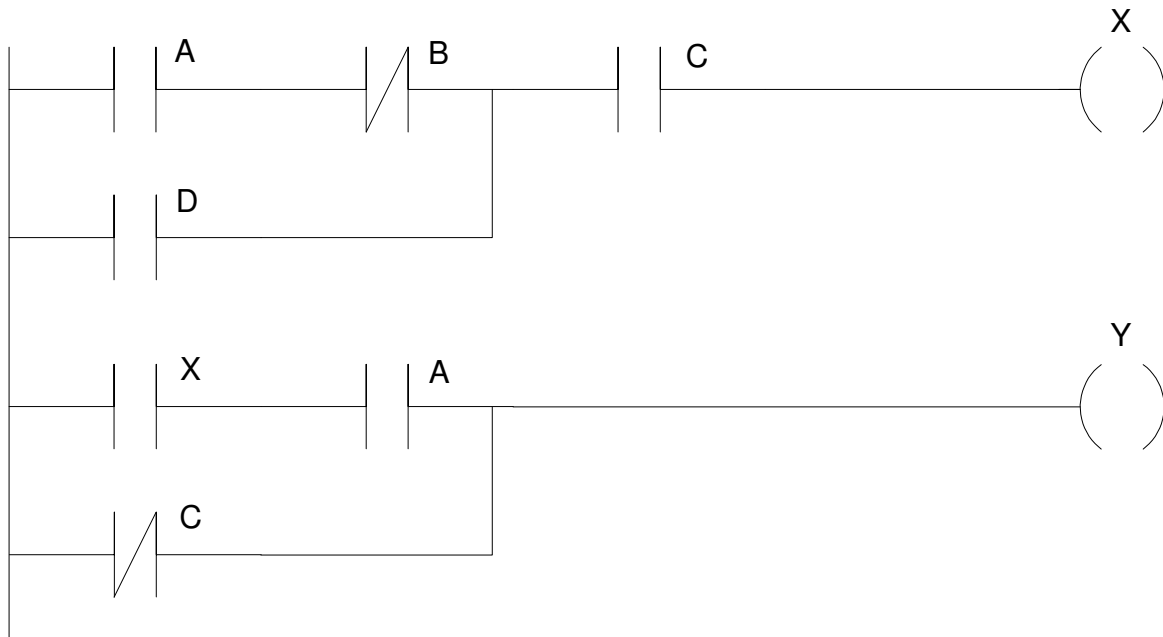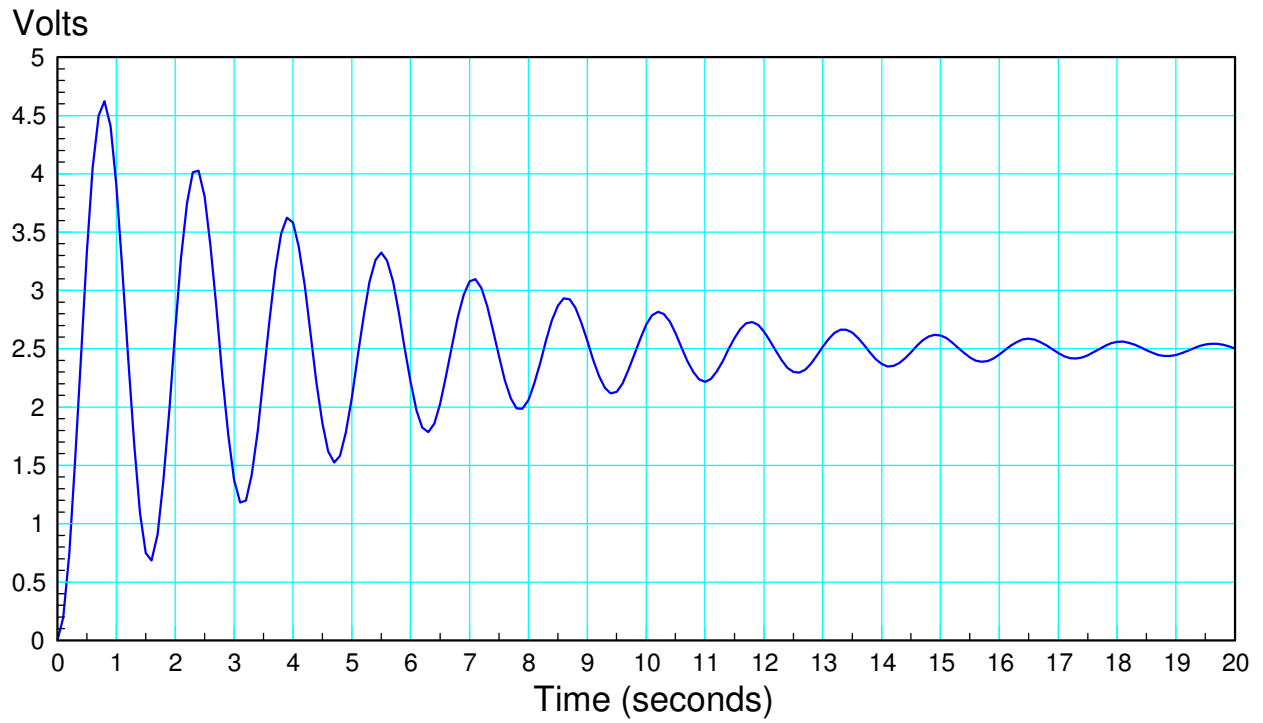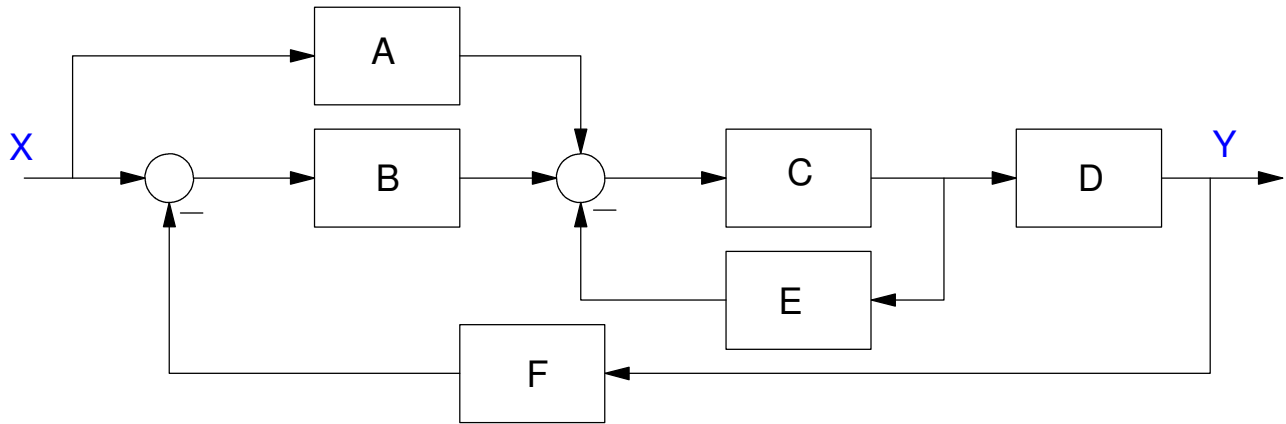# ECE 461/661 - Test #1: Name _____

1) Determine the function Y = f(A, B, C, D) for the following ladder logic circuit. (you don't need to simplify)

2) Give the transfer function for a system with the following response to a unit step input:
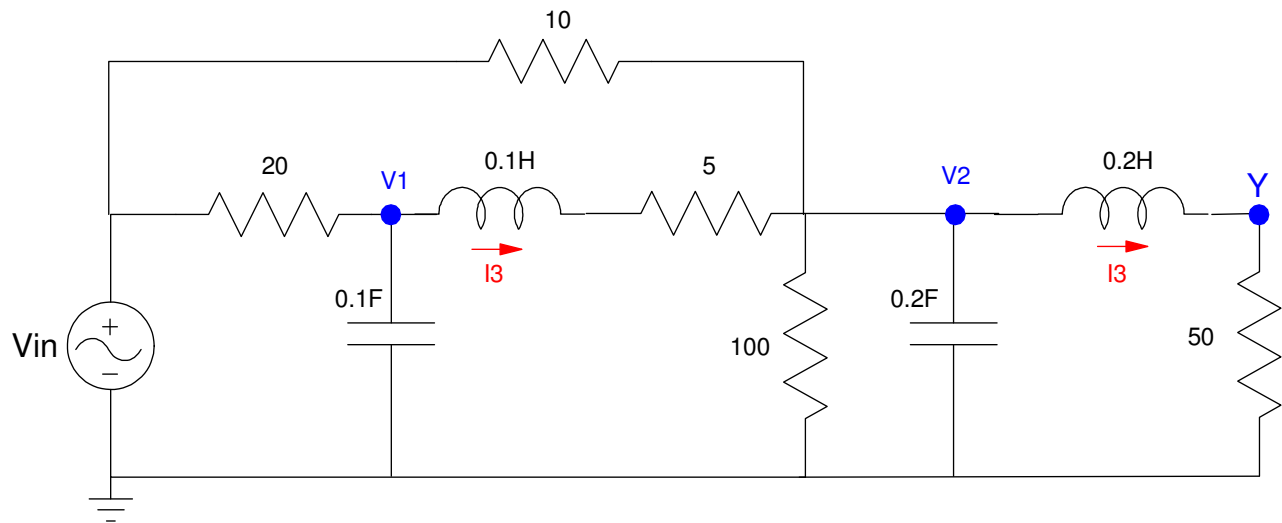

Volts

(vertical axis labeled 0, 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5)

Time (seconds)

(horizontal axis labeled 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20)

3) Find the transfer funciton from X to Y

4) For the following RLC circuit:
   - Write the dynamics of this system as four compled differential equations in terms of {Vin, V1, V2, I3, I4}
   - Express these dynamics in state-space form

5) For the following mass-spring system
- Draw the circuit equivalent for the following mass-spring system
- Write the equations of motion (i.e. write the voltage node equations)