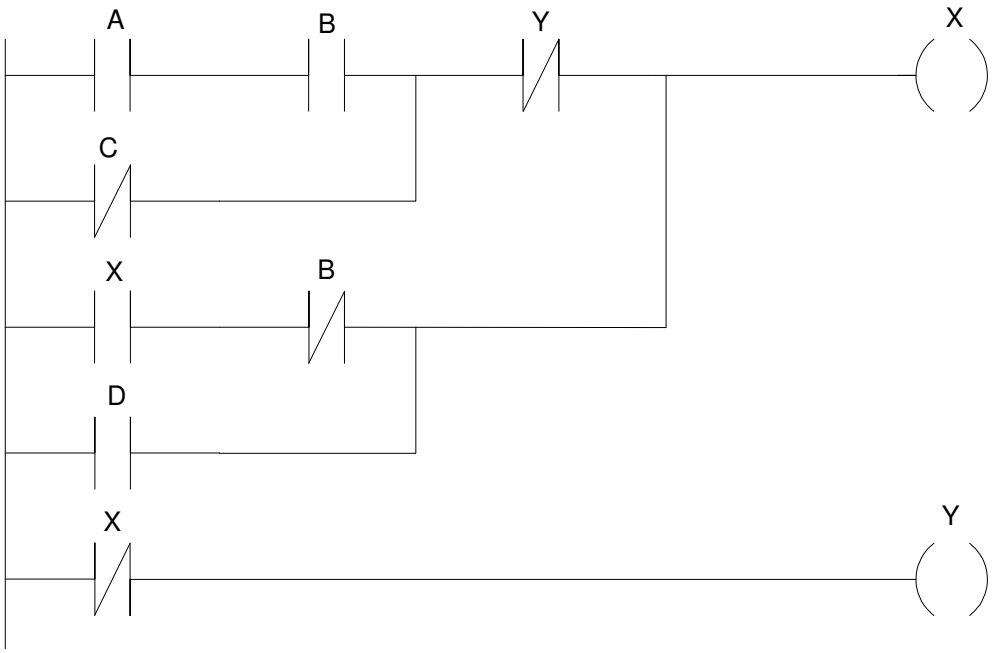
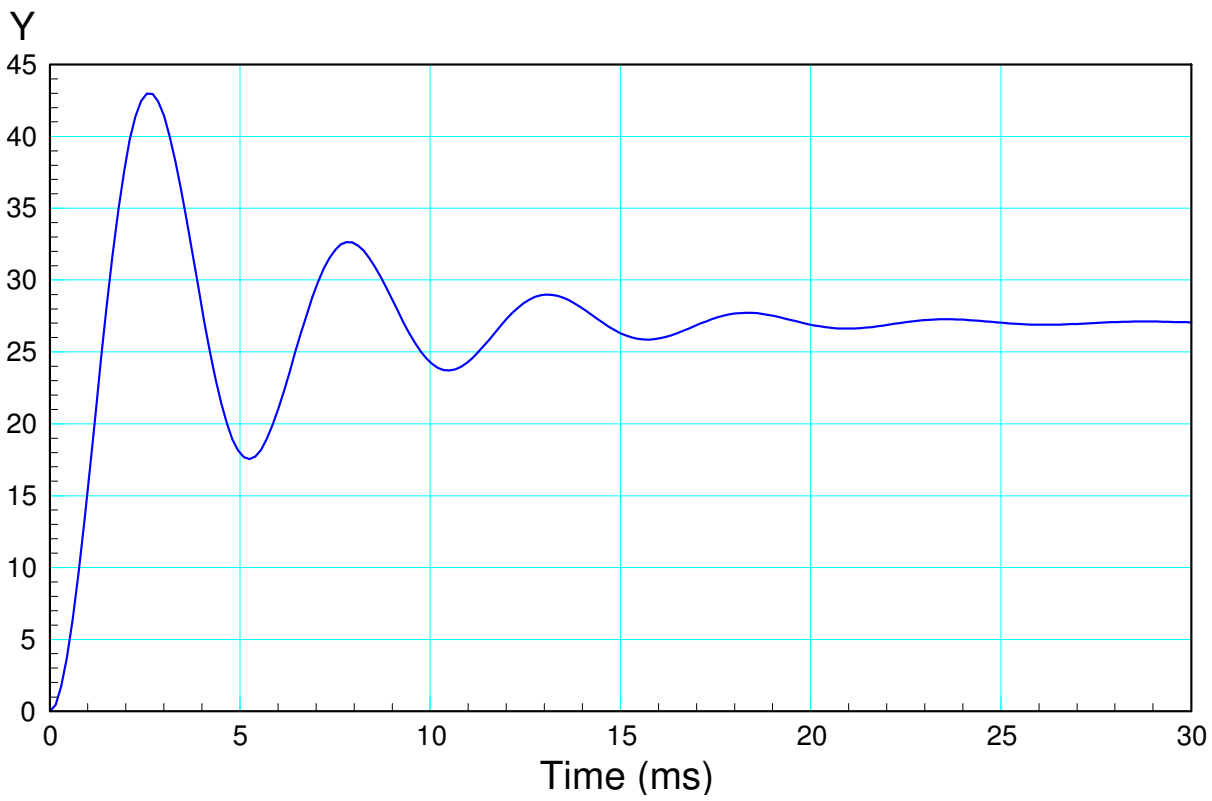
ECE 461/661 - Test #1: Name _____

Fall 2021

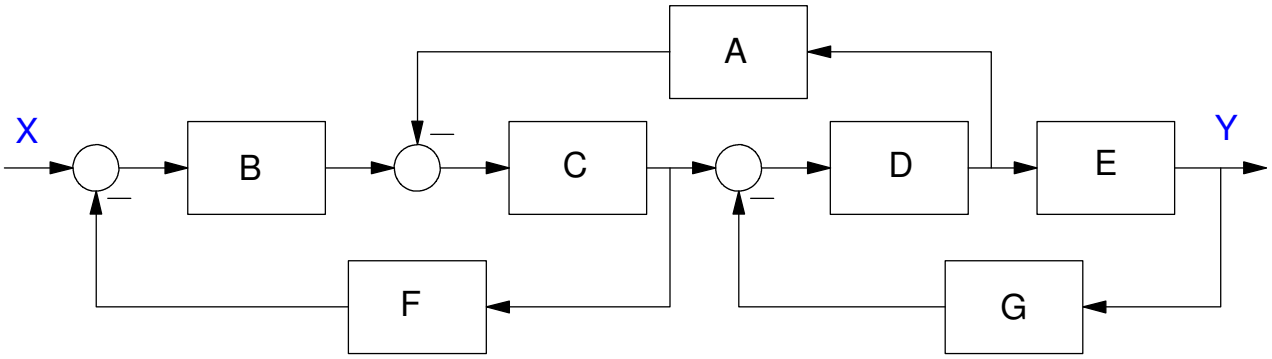
1) Determine the functions for X and Y according to the following ladder diagram. (you don't need to simplify)



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

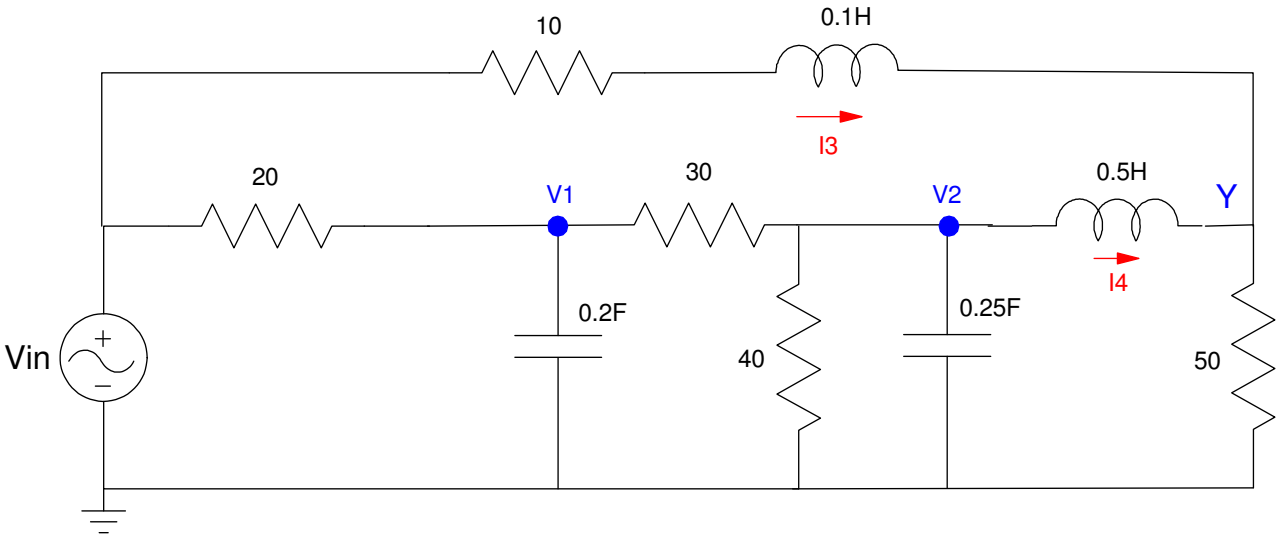


3) Find the transfer funciton from X to Y



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)