ECE 2100 Circuit Analysis
Spring 2017
Exam #1

NAME: _____

INSTRUCTIONS:

1. **THIS EXAM IS CLOSED BOOK AND CLOSED NOTES.**
2. **NO ELECTRONIC DEVICES ARE ALLOWED**.
3. Work each problem in the provided space.
4. Show ALL work required to arrive at a solution for either full or partial credit.
5. READ the entire question before answering.
6. CIRCLE YOUR ANSWERS.
7. Have your student ID on your desktop for inspection by the instructor.
8. SIGN the honesty pledge at the bottom of the page. Exams without a signature will receive no credit.

I have neither given nor received assistance from anyone in regards to completion of this exam. I have followed the instructions as provided on this sheet. I HAVE VERIFIED THAT THIS EXAM HAS (7) PAGES.

SIGNATURE: _____ DATE: _____

Note: some problems might be adapted from the course text or other sources. Schematics prepared using LTspice IV (linear.com).

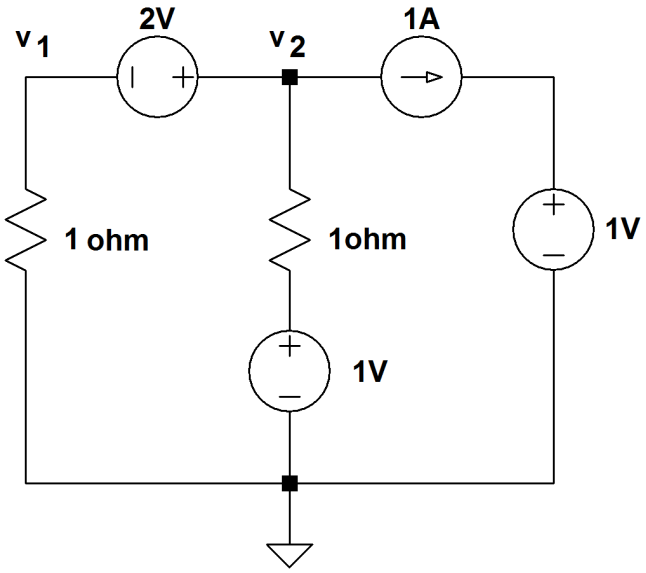
Maximum exam score is 30 points.

1. (3 points) What is the ideal input resistance of an ammeter? Justify your response by using a Thevenin equivalent model of the circuit under test.

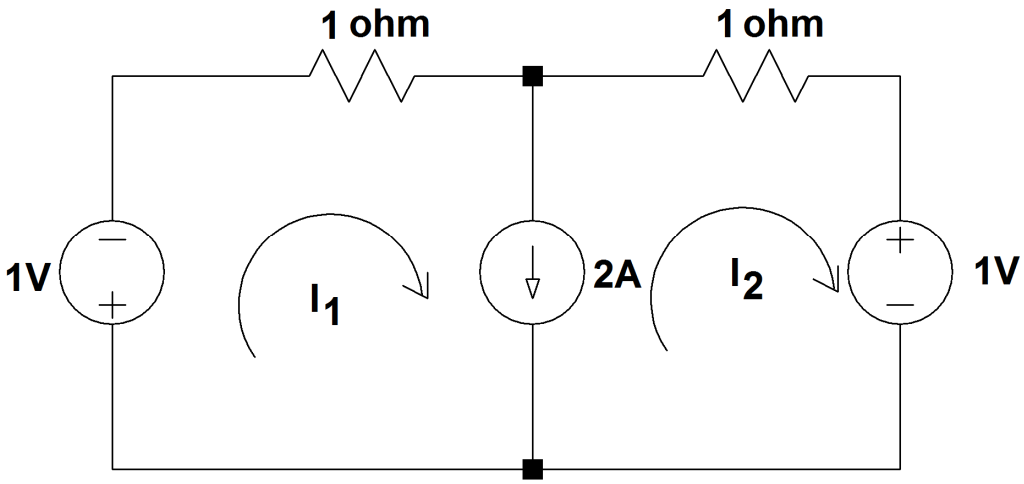
2. (2 points) Consider the system $y = a\,x$ where x is the system input, y is the system output, and a is a scalar. Find the values of a for which this system is linear. Justify your response.

3. (5 points) A meter movement has a series resistance of 1Ω and a full scale current of 1mA. Use this meter movement to design a 10A full scale ammeter. Be sure to show a schematic of your design.

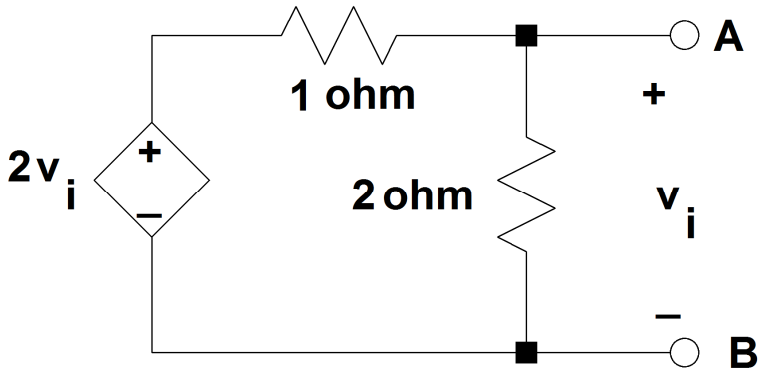
4. (5 points) Find node voltages v_1 and v_2 using nodal analysis.



5. (5 points) Find mesh currents I_1 and I_2 using mesh analysis.



6. (5 points) Thevenize the following circuit “looking into” terminals A-B. Be sure to sketch the Thevenin equivalent circuit.



7. (5 points) Find the power of each circuit element. Be sure to show all work.