

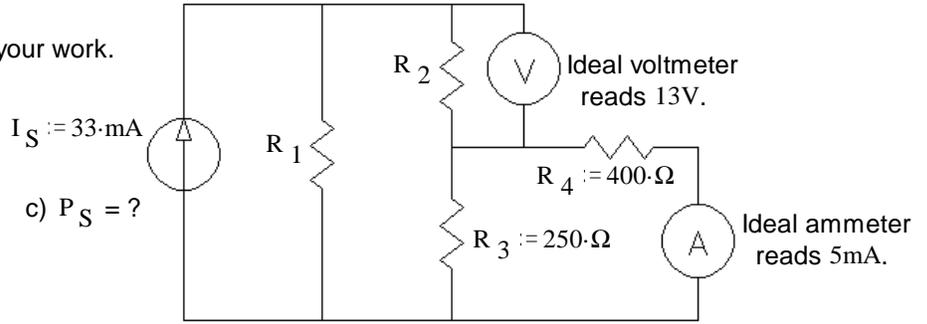
ECE 2210/00 Exam 1 given: Fall 12

(The space between problems has been removed.)

Suggestion: Do this exam backwards.

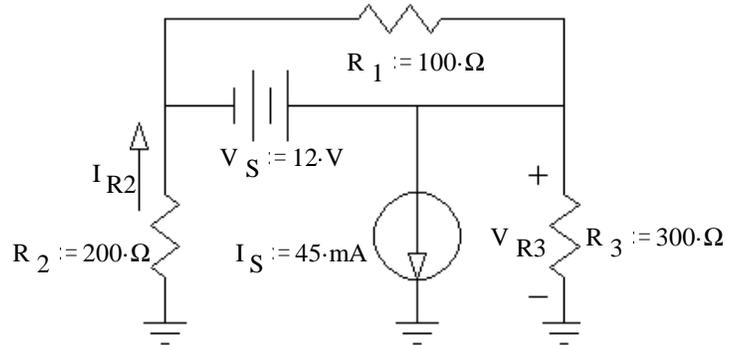
1. (21 pts) Find the values below. Show your work.

- a) $R_2 = ?$
- b) $R_1 = ?$
- c) $P_S = ?$



2. (22 pts) Use the method of superposition to find I_{R2} and V_{R3} .

Be sure to redraw the circuit as needed and to clearly show and **circle** your intermediate results.



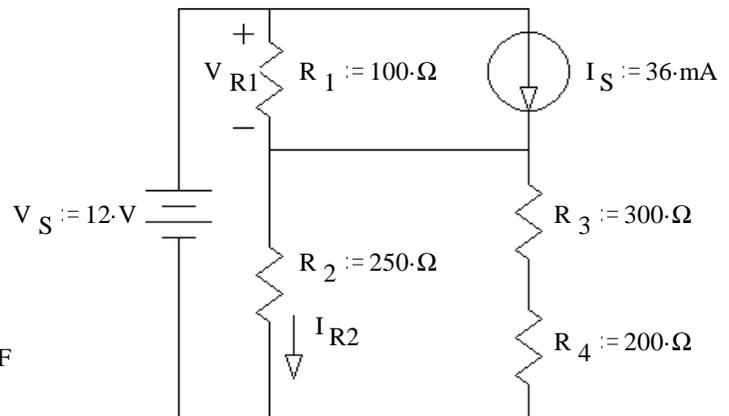
3. (12 pts) An ideal voltmeter is hooked to the terminals of a temperature sensor and measures 150 mV when the sensor is at 60° F and no load is connected. A 12 kΩ load resistor is hooked to the sensor and the voltmeter now reads 120 mV. Draw a simple, reasonable model of the 60° F temperature sensor. Find the value of each part of the model.

4. (18 pts) A rechargeable battery may be modeled as a voltage source of 12 V and a source resistance of 5 Ω

- a) The battery is hooked to a load resistor of 10 Ω. How much power will the load resistor dissipate?
- b) What voltage would be required to charge this battery at 500 mA?

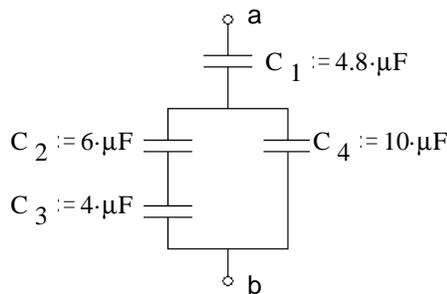
5. (19 pts) Use nodal analysis to find V_{R1} and I_{R2} .

You **MUST** show all the steps of nodal analysis work to get credit, including drawing appropriate symbols and labels on the circuit shown.



6. (8 pts)

Find C_{eq} between terminals a and b.



Answers

- 1. a) 1·kΩ b) 750·Ω c) 495·mW
- 2. 24·mA + 27·mA = 51·mA 7.2·V - 5.4·V = 1.8·V
- 4. a) 6.4·W b) 14.5·V
- 5. 2.25·V 39·mA 6. 3.46·μF

