

ECE 2210/00 Exam 1 given: Spring 17 (The space between problems has been removed.)

Closed Book, Closed notes, Calculators OK, Show all work to receive credit

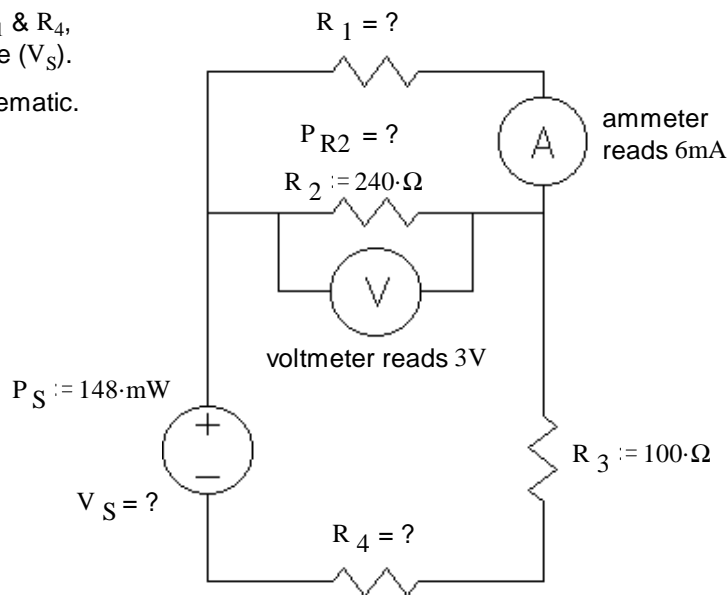
Circle answers, show units, and round off reasonably

To get the most possible partial credit, always show all the intermediate values that you can calculate. If further calculations depend on a value that you can't figure out, just use a letter (like I_{R1}) or a guessed value and proceed.

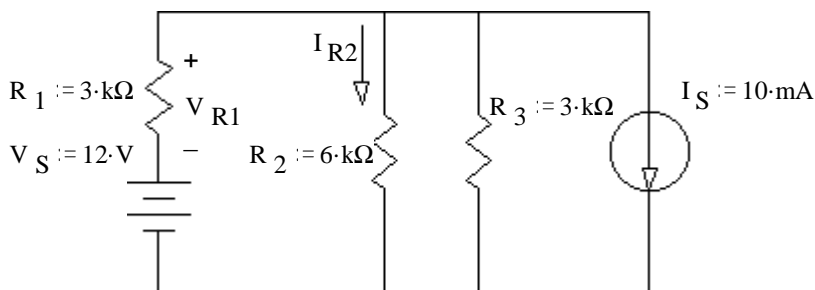
1. (25 pts) In the circuit shown find the resistor values of R_1 & R_4 , the power dissipated by R_2 (P_{R2}), and the source voltage (V_S).

Note: feel free to show answers & work right on the schematic.

- $R_1 = ?$
- $R_4 = ?$
- $P_{R2} = ?$
- $V_S = ?$

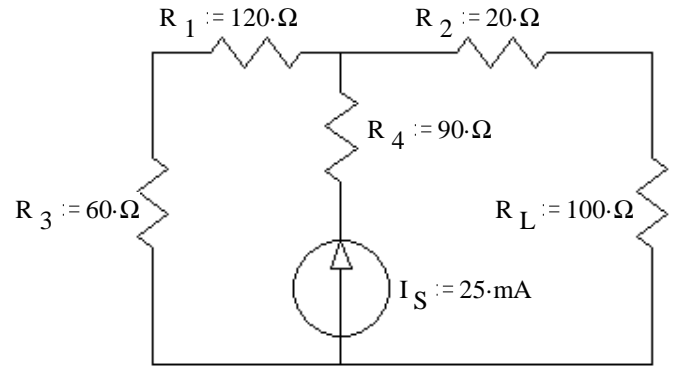


2. (27 pts) Use the method of superposition to find I_{R2} and V_{R1} . Be sure to clearly show and **circle** your intermediate results.



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3. (24 pts) a) Find and draw the Thévenin equivalent of the circuit shown. The load resistor is R_L .

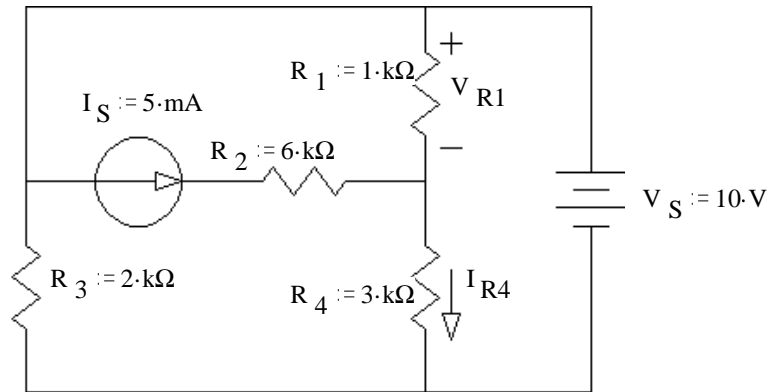


b) Find the load current using your Thévenin equivalent circuit.

c) Choose a different value of R_L so as to maximize the power dissipated in R_L . Find that maximum power (P_{R_L}).

4. (24 pts) a) Use nodal analysis to find the voltage across R_1 (V_{R1}).

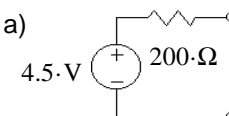
You **MUST** show all the steps of nodal analysis work to get credit, including drawing appropriate symbols and labels on the circuit shown.



b) Find the current through R_4 (I_{R4}). $I_{R4} = ?$

Answers

1. a) $500 \cdot \Omega$ b) $170.3 \cdot \Omega$ c) $37.5 \cdot \text{mW}$ d) $8 \cdot \text{V}$

3. a)  b) $15 \cdot \text{mA}$ c) $200 \cdot \Omega$
 $25.3 \cdot \text{mW}$

2. $-1.2 \cdot \text{mA}$ $-19.2 \cdot \text{V}$

4. a) $-1.25 \cdot \text{V}$ b) $3.75 \cdot \text{mA}$

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