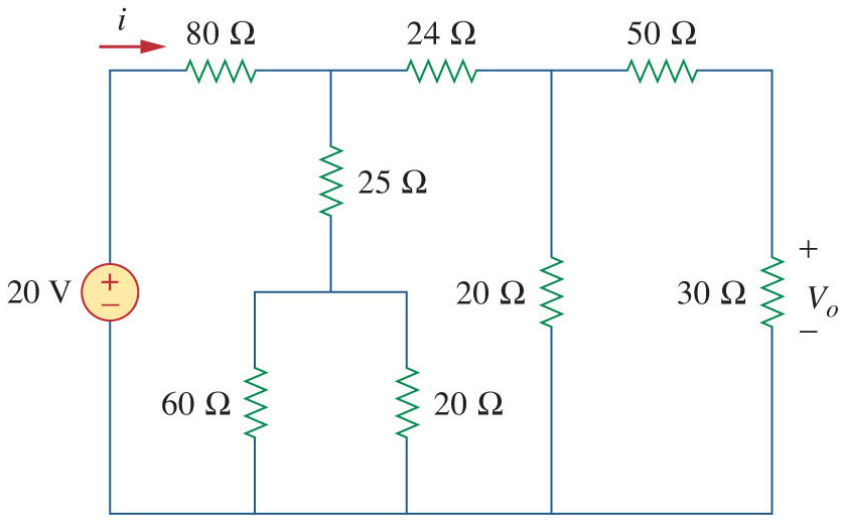
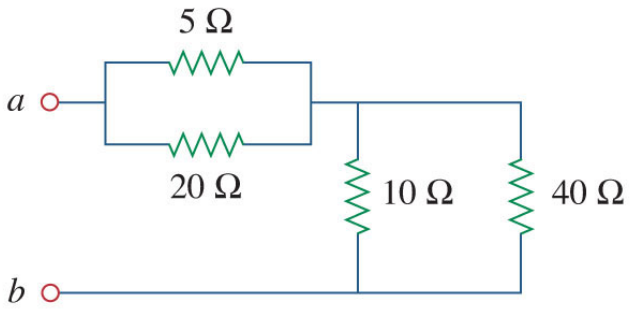
EGR 220 HW 2 Due Feb 13

Chapter 2 Problems

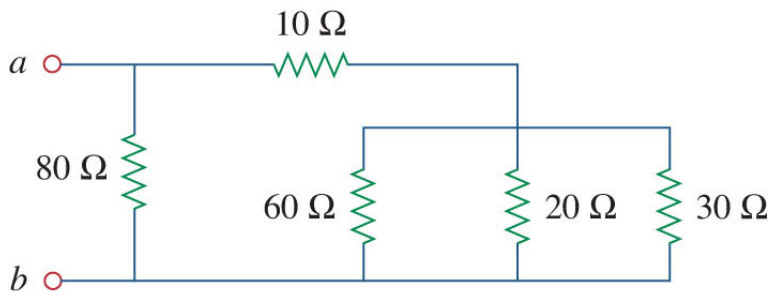
1) Find *i* and V_o in the circuit below. This is to practice calculating R_{eq} for different purposes – first collapsing the circuit to a single R_{eq} value and then expanding it back out gradually to find V_o



2) Calculate the equivalent resistance, R_{ab}, at terminals a-b for the circuit below.

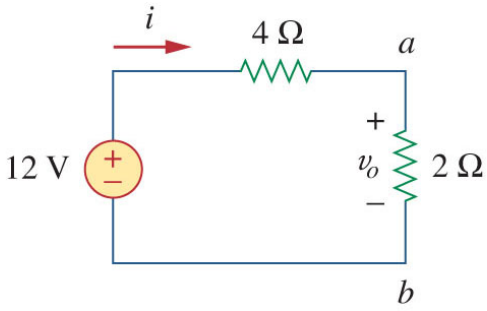


3) Calculate the equivalent resistance, R_{ab}, at terminals a-b for the circuit below.



Problem 4 (related to Lab 2)
Assume you have built the circuit below in lab, and are going to use the multi-meter, as a voltmeter to measure the voltage across different branches in the circuit.

4a) Calculate the value of i and V_{ab} without a voltmeter in the circuit.
4b) If you were to measure V_{ab} across the 2Ω resistor, what affect would the voltmeter have on your measurement if the internal resistance of the voltmeter were: 0Ω? 2Ω? 10MΩ?
4c) Without the voltmeter in the circuit, what is the current, i? Now assuming the voltmeter is attached across the 2Ω resistor, state if the current in the circuit would increase, decrease, or remain essentially unchanged, if the voltmeter's internal resistance were to be: 0Ω, 2Ω, or 10MΩ.



Problem 5 (related to Lab 2)
Assume you have built the circuit below in lab, and are going to use the multi-meter, as an ammeter to measure the current through different branches in the circuit.

5a) Without the ammeter in the circuit, calculate the current i_1 and the voltage, v_o.
5b) If you were to measure i_1, what affect would the ammeter have on your measurement if the internal resistance of the ammeter were: 0Ω? 9kΩ? 10MΩ? Calculate the numerical value of i_1 in each case.

5c) Assuming the ammeter is inserted such that i_1 will be measured, determine if the voltage v_o in the circuit would increase, decrease, or remain essentially unchanged, if the ammeter's internal resistance were to be: 0Ω, 9kΩ, 10MΩ. Calculate the numerical value of v_o in each case.