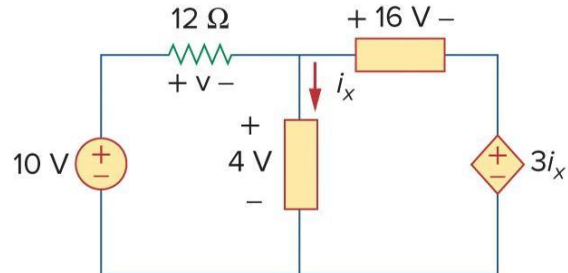


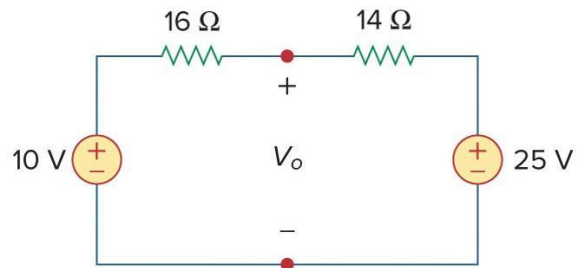
# Electric Circuits

## Homework Set 5

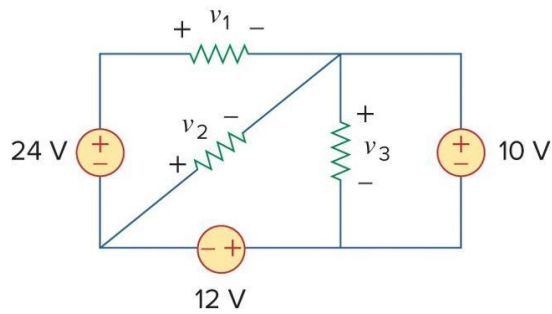
1. Calculate  $v$  and  $i_x$  in the following circuit.



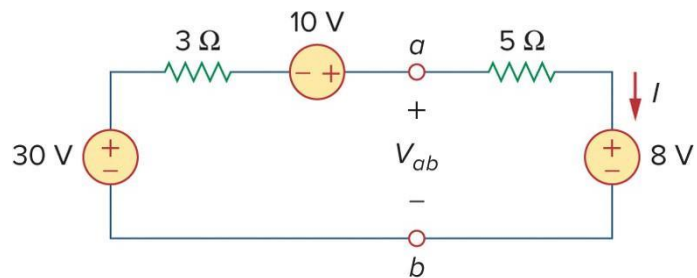
2. Determine  $V_o$  in the following circuit.



3. Obtain  $v_1$  through  $v_3$  in the following circuit.

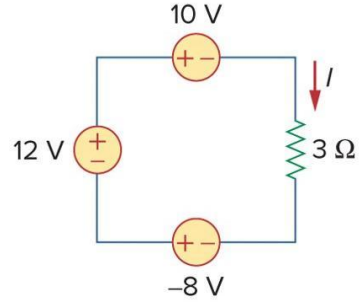


4. In the circuit below, find  $I$  and  $V_{ab}$ .

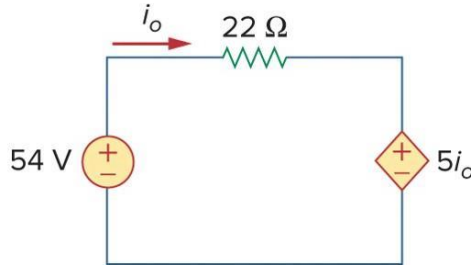


5. In the circuit at right, find:

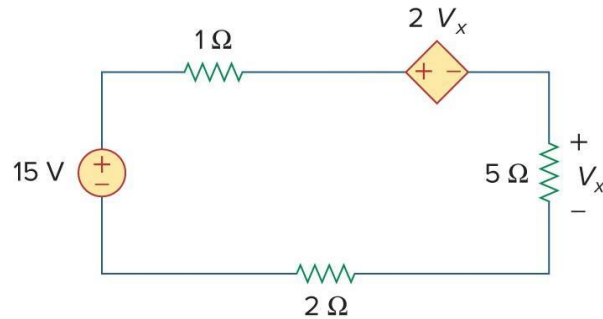
- $I$
- The power dissipated by the resistor
- The power supplied by **each** source



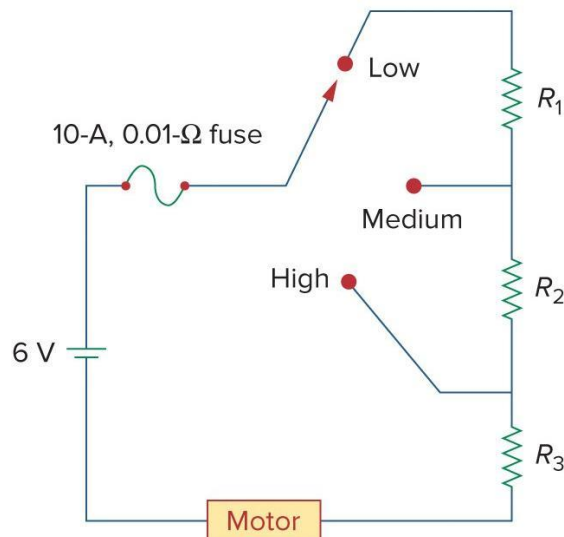
6. Determine  $i_o$  in the following circuit.



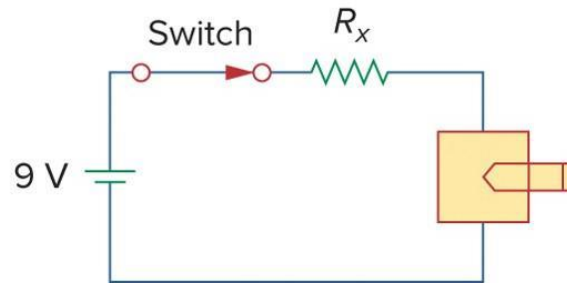
7. Find  $V_x$  in the following circuit.



8. The following circuit is to control the speed of a motor such that the motor draws currents of 5 A, 3 A, and 1 A when the switch is at high, medium, and low positions, respectively. The motor can be modeled as a load resistance of  $20\text{ m}\Omega$ . Determine the series dropping resistances  $R_1$ ,  $R_2$ , and  $R_3$ .



9. An electric pencil sharpener rated 240 mW, 6 V is connected to a 9-V battery as shown below. Calculate the value of the series-dropping resistor  $R_x$  needed to power the sharpener.



10. A loudspeaker is connected to an amplifier as shown below. If a  $10\ \Omega$  loudspeaker draws a maximum power of 12 W from the amplifier, determine the maximum power a  $4\ \Omega$  loudspeaker will draw.



11. In a certain application, the circuit below must be designed to meet the following two criteria:

- a.  $V_o/V_s = 0.05$
- b.  $R_{eq} = 40\ \text{k}\Omega$

If the load resistor,  $5\ \text{k}\Omega$ , is fixed, find  $R_1$  and  $R_2$  to meet the criteria.

