

PHYS 51W - Workshop - Week of March 16-22

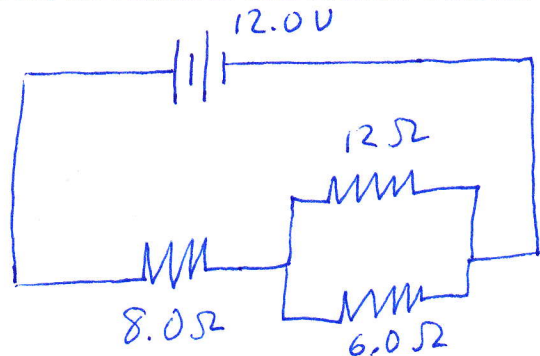
These problems are based on the content of Chapter 26, Direct-Current Circuits

1. a. An 8.0 V battery (with no internal resistance) is connected to two 4.0Ω resistors in series. Find the equivalent resistance; the current in each resistor; the potential drop across each resistor.

b. An 8.0 V battery (with no internal resistance) is connected to two 4.0Ω resistors in parallel. Find the equivalent resistance; the current in each resistor; the potential drop across each resistor.

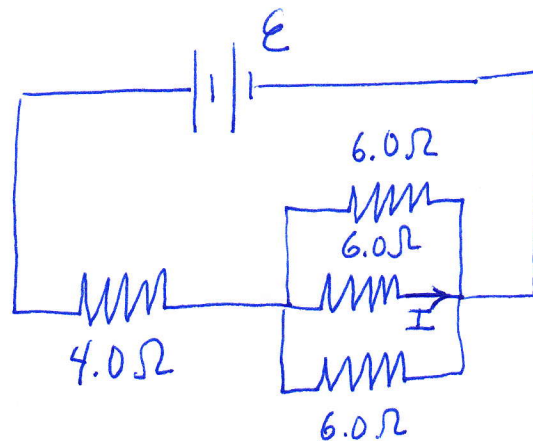
2. In the circuit below, the battery has no internal resistance.

- Find the equivalent resistance. Determine the current coming from the battery.
- Find the current in each resistor. Find the voltage across each resistor.

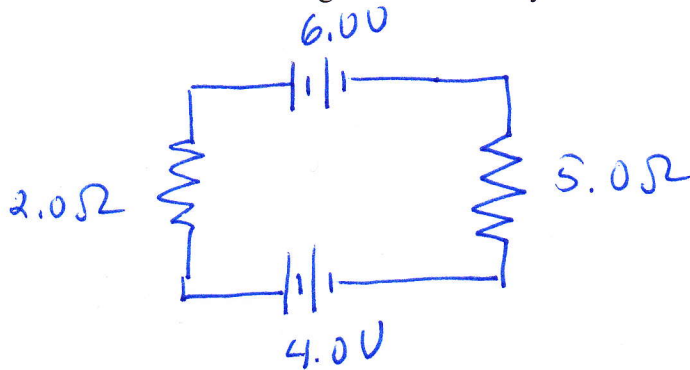


3. In the circuit below an unknown emf ϵ is connected to the resistors shown. The middle 6Ω resistor is observed to have 0.50 A of current flowing through it.

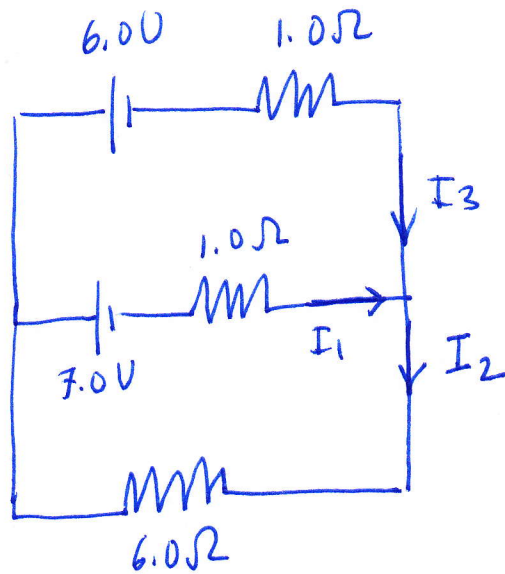
- Determine the voltage across each resistor, and the current through each resistor.
- Find the equivalent resistance and the emf ϵ .



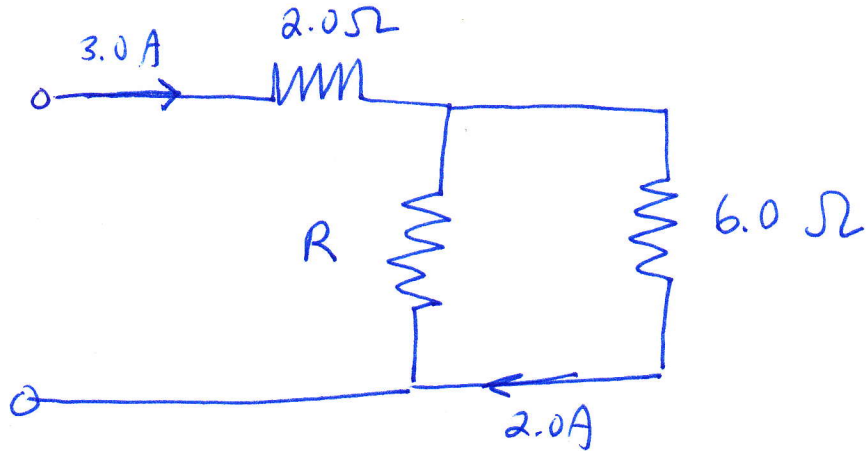
4. In the circuit below, each emf has a 1.0Ω internal resistance.
- Find the current. Is it clockwise or counterclockwise?
 - Find the terminal voltage of each battery.



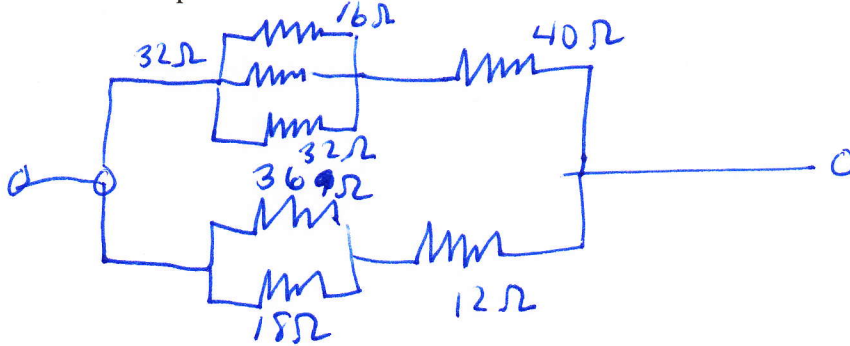
5. In the circuit below, the emfs have no internal resistance. Find the currents I_1 , I_2 , and I_3 .



6. In the network show below, find the unknown resistance R. Find the equivalent resistance of the network.

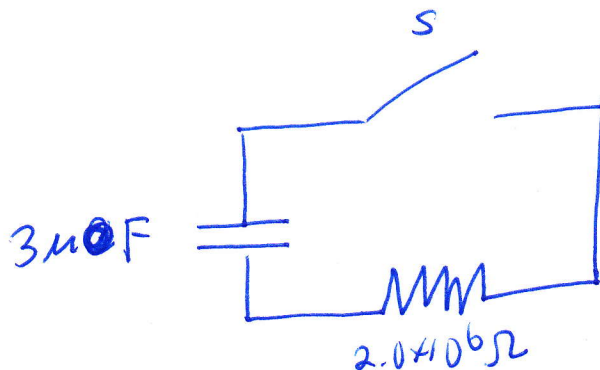


7. Find the equivalent resistance of the network shown below.



8. In the circuit shown, the switch S is initially open. The initial voltage across the capacitor is 10.0 volts.

- How much charge is on the capacitor initially?
- The switch is closed. What is the time constant of the circuit?
- How much time does it take for the voltage across the capacitor to fall to 5.0 volts? What is the current passing through the resistor at this time?



9. A 1500 W toaster is connected to a 120-V power supply.
- How much current goes through the toaster when it is on?
 - Electrical energy costs 18 cents per kilowatt.hr. How much does it cost to leave the toaster on for three and a half hours?

10. Find the equivalent resistance for the circuit shown. Determine the current in each resistor.

