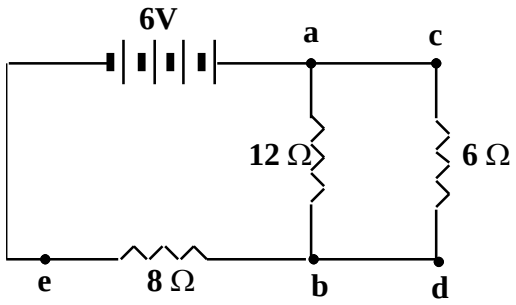
Name_____

Date _____Pd ____

AP E&M - Worksheet 5

1. Consider the combination circuit at right.



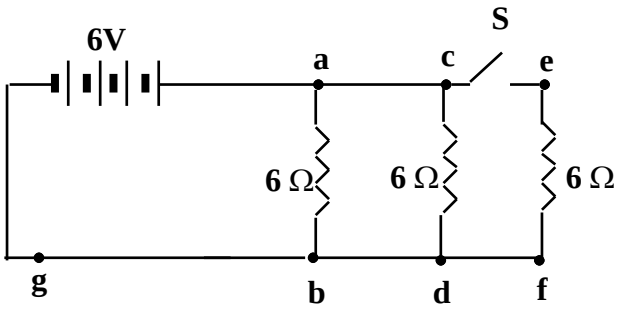
   a. Determine the equivalent resistance of the circuit.

   b. What is the current passing through each resistor?

   c. What is the ΔV across each resistor?

   d. What is the power dissipated by each resistor?

2. Suppose the switch in the circuit at right is closed. What effect does this have on:



   a. the ΔV from a to b?

   b. the current in the first two resistors?

   c. the current through point g?

3. A 10 ohm and a 15 ohm resistor are connected in parallel and placed across the terminals of a 15 volt battery.

   a. Sketch the circuit diagram.

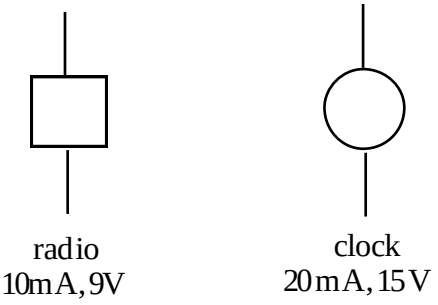
   b. Calculate the equivalent resistance of the circuit.

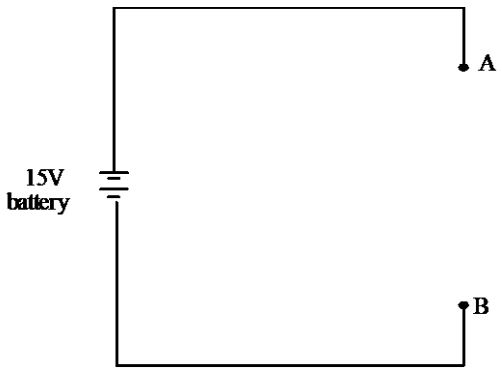
   c. Calculate the current through the entire circuit.

   d. Calculate the current in each branch.

4. A cabin contains only two small electrical appliances: a radio that requires 10 milliamperes of current at 9.0 V, and a clock that requires 20 milliamperes at 15 V. A 15 V battery with negligible internal resistance supplies the electrical energy to operate the radio and clock.

   a. Complete the diagram below to show how the radio, clock and a single resistor R can be connected between points A and B so that the correct potential difference is applied across each appliance. Use the symbols at right to indicate the clock and radio.

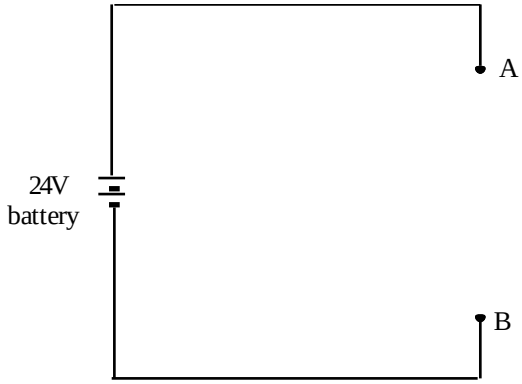




b. Calculate the resistance of R.

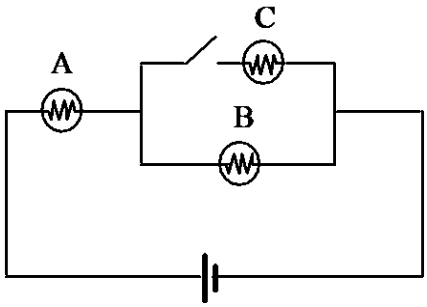
c. Calculate the electrical energy that must be supplied by the battery to operate the circuit for 1 minute.

5. The electrical device whose symbol is shown at right requires a terminal voltage of 12 V and a current of 2.0 A for proper operation.



Using only this device and one or more 3-Ω resistors, design a circuit so that the device will operate properly when the circuit is connected across a 24 V battery with negligible internal resistance.

6. Consider the circuit below. All the bulbs have resistance **R**.



a. What is the resistance of the circuit while the switch is open?

b. What is the resistance of the circuit when the switch is closed?

c. How does closing the switch affect the brightness of bulbs A and B? Explain in terms of current and potential drop.