Ch28 (Homework)
Current Score : – / 34 **Due :** Monday, August 27 2018 02:25 PM CDT

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1. –/2 pointsSerPSE9 28.P.003.WI.

An automobile battery has an emf of 12.6 V and an internal resistance of 0.0560 Ω. The headlights together have an equivalent resistance of 4.60 Ω (assumed constant).

(a) What is the potential difference across the headlight bulbs when they are the only load on the battery? (Enter your answer to at least two decimal places.)

[ ] V

(b) What is the potential difference across the headlight bulbs when the starter motor is operated, with 35.0 A of current in the motor? (Enter your answer to at least two decimal places.)

[ ] V

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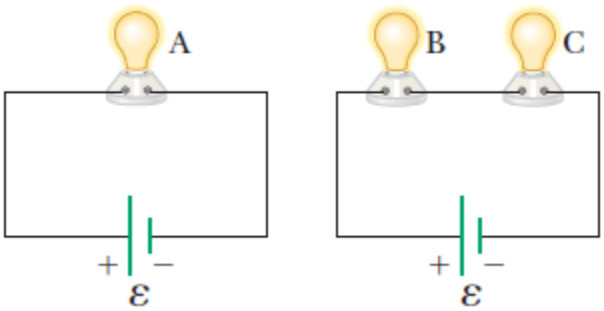
2. –/7 pointsSerPSE9 28.P.008.

Consider the two circuits shown in the figure below in which the batteries are identical. The resistance of each lightbulb is *R*. Neglect the internal resistance of the batteries.



(a) Find expressions for the currents in each lightbulb. (Use the following as necessary: $\mathscr{E}$ for $\mathcal{E}$ and *R*.)

$I_A =$

$I_B =$

$I_C =$

(b) How does the brightness of B compare with that of C? (Use only ">" or "=" symbols. Do not include any parentheses around the letters or symbols.)

Explain.

This answer has not been graded yet.

(c) How does the brightness of A compare with that of B and of C? (Use only ">" or "=" symbols. Do not include any parentheses around the letters or symbols.)

Explain.

This answer has not been graded yet.

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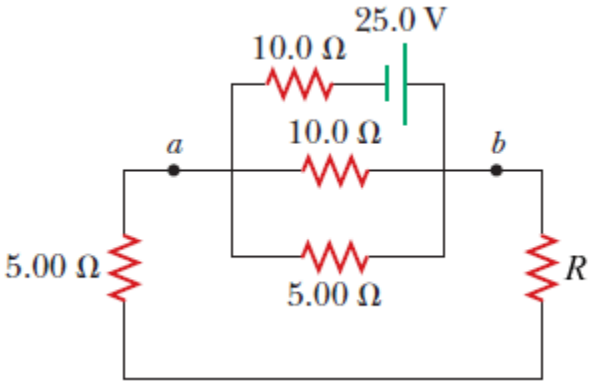
3. –/2 pointsSerPSE9 28.P.009.MI.FB.

Consider the circuit shown in the figure below. (Let R = 18.0 Ω.)



(a) Find the current in the 18.0-Ω resistor.

A

(b) Find the potential difference between points *a* and *b*.

V

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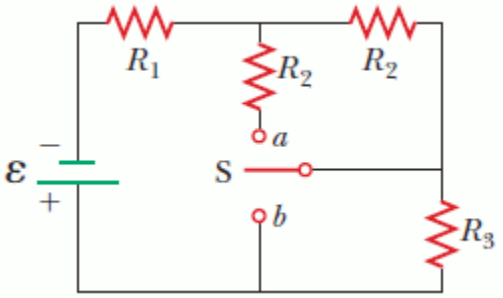
4. –/3 pointsSerPSE9 28.P.011.

A battery with $\mathcal{E}$ = 3.00 V and no internal resistance supplies current to the circuit shown in the figure below. When the double-throw switch S is open as shown in the figure, the current in the battery is 1.09 mA. When the switch is closed in position *a*, the current in the battery is 1.22 mA. When the switch is closed in position *b*, the current in the battery is 2.01 mA. Find the following resistances.



(a) R_1

[ ] kΩ

(b) R_2

[ ] kΩ

(c) R_3

[ ] kΩ

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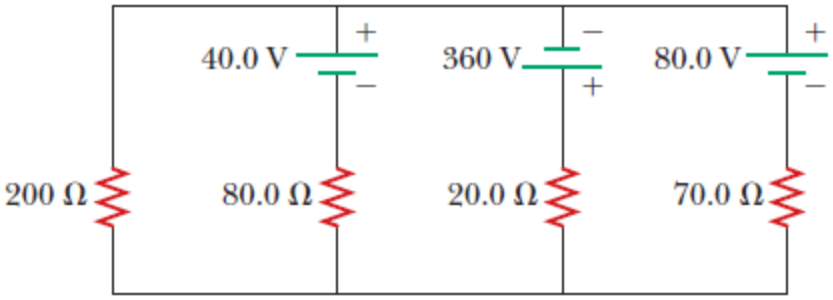
5. –/5 pointsSerPSE9 28.P.030.WI.

In the circuit in the figure below, determine the following.



(a) the current in each resistor (Indicate the direction of the current flow through each resistor through the sign of your answer. Take upward current flow as positive.)

Resistor (Ω)	Current (A)
200	
80.0	
20.0	
70.0	

(b) the potential difference across the 70 Ω resistor

V

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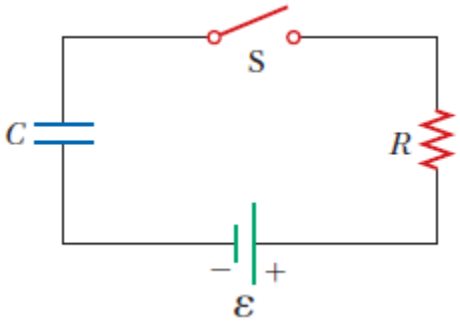
6. –/3 pointsSerPSE9 28.P.038.WI.

Consider a series *RC* circuit as in the figure below for which R = 3.00 MΩ, C = 6.00 μF, and ε = 34.0 V.



(a) Find the time constant of the circuit.

[ ] s

(b) What is the maximum charge on the capacitor after the switch is thrown closed?

[ ] μC

(c) Find the current in the resistor 10.0 s after the switch is closed.

[ ] μA

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7. –/5 pointsSerPSE9 28.P.046.MI.

An electric heater is rated at 2.00×10^3 W, a toaster at 500 W, and an electric grill at 1.00×10^3 W. The three appliances are connected to a common 120-V household circuit.

(a) How much current does each draw?

heater ____ A

toaster ____ A

grill ____ A

(b) If the circuit is protected with a 30.0-A circuit breaker, will the circuit breaker be tripped in this situation?

- Yes
- No

Explain your answer.

This answer has not been graded yet.

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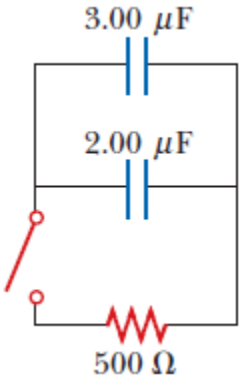
8. –/3 pointsSerPSE9 28.P.063.

The pair of capacitors in the figure below are fully charged by a 24.0-V battery. The battery is disconnected, and the switch is then closed.



(a) After 3.0 ms has elapsed, how much charge remains on the 3.00-μF capacitor?

[ ] μC

(b) After 3.0 ms has elapsed, how much charge remains on the 2.00-μF capacitor?

[ ] μC

(c) What is the current in the resistor at this time?

[ ] mA

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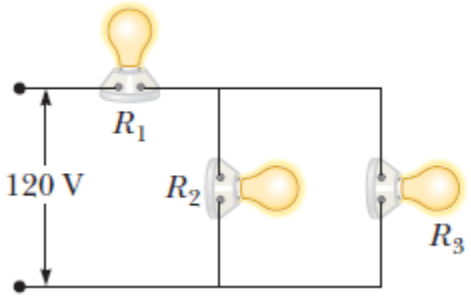
9. –/4 pointsSerPSE9 28.P.072.MI.

Three identical 45.0-W, 120-V lightbulbs are connected across a 120-V power source as shown in in the figure below. Assume that the resistance of each bulb is constant (even though in reality the resistance increases markedly with current).



(a) Find the total power supplied by the power source.

[ ] W

(b) Find the potential difference across each lightbulb.

ΔV_1 = [ ] V

ΔV_2 = [ ] V

ΔV_3 = [ ] V

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