CENGAGE | WEBASSIGN

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INSTRUCTOR
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# Ohm's Law (Homework)

## Current Score

| QUESTION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINTS | 2/2 | 2/2 | 4/4 | 8/8 | 2/2 | 2/2 | 4/4 | 2/5 | 6/6 | 8/8 | 0/2 | –/1 |

**TOTAL SCORE**

| 40/46 | 87.0% |
|---|---|

## Due Date Past Due

**SAT, FEB 22, 2020**
11:59 PM PST

Request Extension

## Assignment Submission & Scoring

### Assignment Submission

For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or change the answer.

### Assignment Scoring

Your last submission is used for your score.

## The due date for this assignment has passed.

Your work can be viewed below, but no changes can be made.

**Important!** Before you view the answer key, decide whether or not you plan to request an extension. Your Instructor may not grant you an extension if you have viewed the answer key. Automatic extensions are not granted if you have viewed the answer key.

Request Extension | View Key

1. 2/2 points | Previous Answers | SERCP11 17.2.OP.001.

My Notes | Ask Your Teacher

A copper wire carries a current of 87.4 mA.

(a) Find the number of electrons that flow past a given point in the wire in 10.6 minutes.

3.47e20 ✓ electrons

(b) In what direction do the electrons travel with respect to the current?

- same direction
- opposite direction
- The magnitude is zero.

✓

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2. 2/2 points Previous Answers **SERCP11 17.2.P.002.**

My Notes Ask Your Teacher

A copper wire has a circular cross section with a radius of 1.76 mm.

HINT

(a) If the wire carries a current of 3.18 A, find the drift speed (in m/s) of electrons in the wire. (Take the density of mobile charge carriers in copper to be $n = 1.10 \times 10^{29}$ electrons/$m^3$.)

1.86e-5 ✓ The drift speed of an electron in a wire is very small, typically about one-billionth of its random thermal speed. m/s

(b) For the same wire size and current, find the drift speed (in m/s) of electrons if the wire is made of aluminum with $n = 2.11 \times 10^{29}$ electrons/$m^3$.

9.68e-6 ✓ m/s

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3. 4/4 points | Previous Answers | SERCP11 18.3.OP.006.

My Notes | Ask Your Teacher

(a) Three 7.30 Ω resistors are connected in *series* to a 22.0 V battery.

What is the equivalent resistance (in Ω) of the circuit?

21.90 ✓ Ω

What is the current (in A) in each resistor?

1 ✓ A

(b) Three other 7.30 Ω resistors are all connected in *parallel* across a second 22.0 V battery.

What is the equivalent resistance (in Ω) of this circuit?

2.43 ✓ Ω

What is the current (in A) in each resistor in this circuit?

3.01 ✓ A

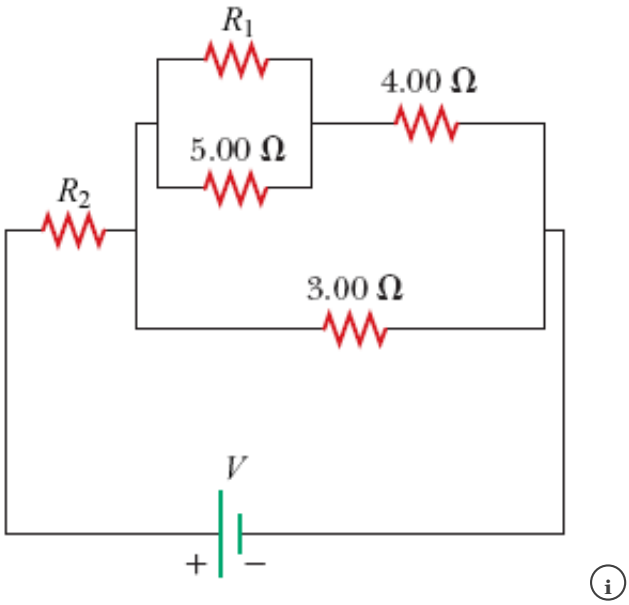
Need Help? Read It

4. 8/8 points | Previous Answers | SERCP11 18.3.OP.010.

My Notes | Ask Your Teacher

Use the exact values you enter to make later calculations.

The figure below shows a battery connected to a circuit. The potential difference across the battery and the resistance of each resistor is given in the figure. (Assume $R_1$ = 12.0 Ω, $R_2$ = 1.20 Ω, and $V$ = 6.00 V.)




(a) What is the equivalent resistance (in Ω) of $R_1$ and the 5.00 Ω resistor?

3.57 ✔ Ω

(b) Using the result from part (a), what is the equivalent resistance (in Ω) of $R_1$, the 5.00 Ω resistor, and the 4.00 Ω resistor?

7.57 ✔ Ω

(c) Using the result from part (b), what is the equivalent resistance (in Ω) of $R_1$, the 5.00 Ω resistor, the 4.00 Ω resistor, and the 3.00 Ω resistor?

2.13 ✔ Ω

(d) Using the result from part (c), what is the equivalent resistance (in Ω) of the entire circuit?

3.33 ✔ Ω

(e) What is the current (in A) through the battery (equivalently, the conventional current that exits the positive terminal of the battery and enters the $R_2$)?

1.80 ✔ A

(f) What is the magnitude of the potential difference (in V) across $R_2$?

2.16 ✔ V

(g) Using the result from part (f) and the battery's potential difference, what is the magnitude of the potential difference (in V) across the 3.00 Ω resistor?

3.84 ✔ V

(h) What is the current (in A) in the 3.00 Ω resistor?

1.28 ✔ A

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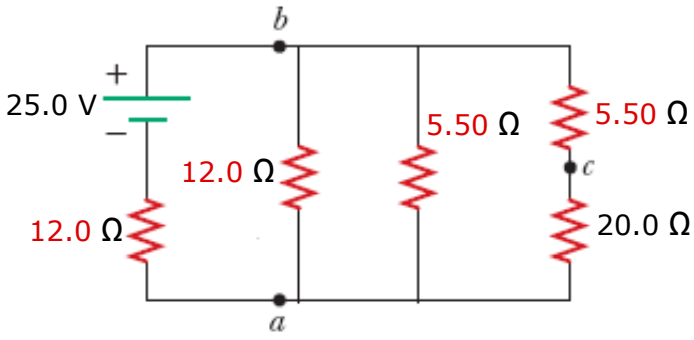
5. 2/2 points | Previous Answers | SERCP11 18.3.OP.011.

My Notes | Ask Your Teacher

The figure below shows a battery connected to a circuit. The potential difference across the battery and the resistance of each resistor is given in the figure.




(a) What is the magnitude of the potential difference (in V) between points *a* and *b* in the circuit?

5.32 ✔ V

(b) What is the current (in A) in the 20.0 Ω resistor?

.21 ✔ A

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6. 2/2 points | Previous Answers | SERCP11 18.3.P.005.

My Notes | Ask Your Teacher

Two resistors, $R_1$ and $R_2$, are connected in series.

HINT

(a) If $R_1$ = 3.22 Ω and $R_2$ = 8.17 Ω, calculate the single resistance equivalent (in Ω) to the series combination.

11.39 ✓ Ω

(b) Repeat the calculation for a parallel combination of $R_1$ and $R_2$. (Enter your answer in Ω.)

2.33 ✓ The most common mistake in calculating the equivalent resistance for resistors in parallel is to forget to invert the answer after summing the reciprocals. Don't forget to flip it! Ω

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7. 4/4 points Previous Answers **SERCP11 18.3.P.006.**

My Notes Ask Your Teacher

Three 2.6 Ω resistors are connected in series with a 15.0 V battery. Find the following.

(a) the equivalent resistance of the circuit

7.80 ✓ Ω

(b) the current in each resistor

1.92 ✓ A

(c) Repeat for the case in which all three resistors are connected in parallel across the battery.

equivalent resistance .87 ✓ Ω

current in each resistor 5.77 ✓ A

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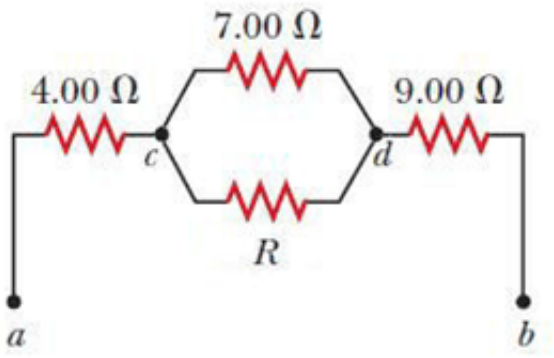
8. 2/5 points | Previous Answers | SERCP11 18.3.P.007.MI.

My Notes | Ask Your Teacher

Consider the following figure.




(a) Find the equivalent resistance between points *a* and *b* in the figure. ($R$ = 16.0 Ω)

18 ✓ Ω

(b) Calculate the current in each resistor if a potential difference of 10.0 V is applied between points *a* and *b*.

$I$ (4.00 Ω) = .56 ✓ A

$I$ (7.00 Ω) = 2.57 ✗ From the value of the current from *a* to *b* find the potential difference across the 7.00-Ω resistor and then find the current through the 7.00-Ω resistor.A

$I$ (16.0 Ω) = *(No Response)* A

$I$ (9.00 Ω) = *(No Response)* A

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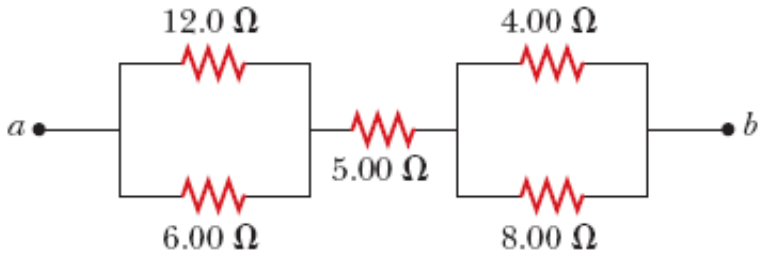
9. 6/6 points | Previous Answers | SERCP11 18.3.P.008.

My Notes | Ask Your Teacher

Consider the combination of resistors shown in the figure below.




(a) Find the equivalent resistance between point *a* and *b*.

11.67 ✓ Ω

(b) If a voltage of 51.8 V is applied between points *a* and *b*, find the current in each resistor.

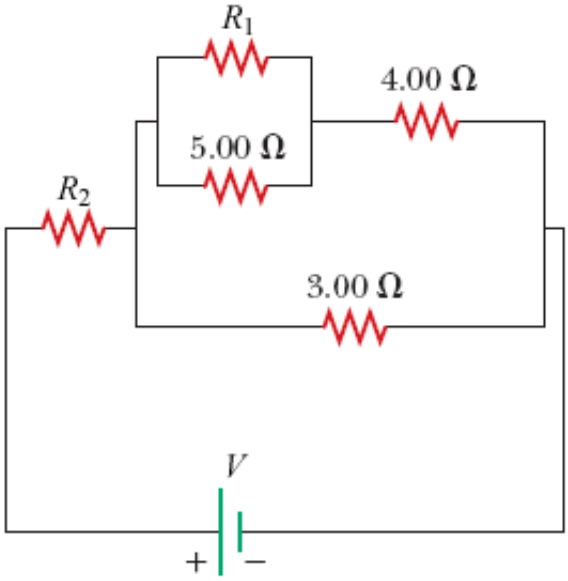
| | | |
|---|---|---|
| 12 Ω | 1.48 ✓ | A |
| 6 Ω | 2.96 ✓ | A |
| 5 Ω | 4.44 ✓ | A |
| 4 Ω | 2.96 ✓ | A |
| 8 Ω | 1.48 ✓ | A |

Need Help? Read It

10. 8/8 points | Previous Answers | SERCP11 18.3.P.010.

My Notes | Ask Your Teacher

Consider the circuit shown in the figure below. (Assume $R_1$ = 11.5 Ω, $R_2$ = 2.70 Ω, and $V$ = 7.60 V.)




(a) Calculate the equivalent resistance of the $R_1$ and 5.00-Ω resistors connected in parallel.

3.48 ✔ Ω

(b) Using the result of part (a), calculate the combined resistance of the $R_1$, 5.00-Ω and 4.00-Ω resistors.

7.48 ✔ Ω

(c) Calculate the equivalent resistance of the combined resistance found in part (b) and the parallel 3.00-Ω resistor.

2.14 ✔ Ω

(d) Combine the equivalent resistance found in part (c) with the $R_2$ resistor.

4.84 ✔ Ω

(e) Calculate the total current in the circuit.

1.57 ✔ A

(f) What is the voltage drop across the $R_2$ resistor?

4.24 ✔ V

(g) Subtracting the result of part (f) from the battery voltage, find the voltage across the 3.00-Ω resistor.

3.36 ✔ V

(h) Calculate the current in the 3.00-Ω resistor.

1.12 ✔ A

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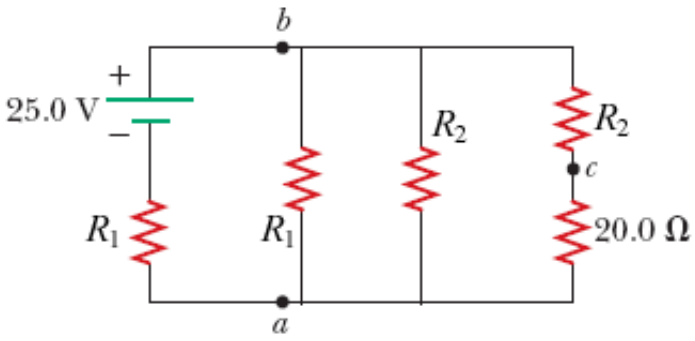
11. 0/2 points Previous Answers **SERCP11 18.3.P.011.**

My Notes Ask Your Teacher

Consider the circuit shown in the figure below. (Assume $R_1$ = 16.0 Ω and $R_2$ = 4.00 Ω.)




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

2.82 ✘

Your response differs from the correct answer by more than 10%. Double check your calculations. V

(b) Find the current in the 20.0-Ω resistor.

*(No Response)* A

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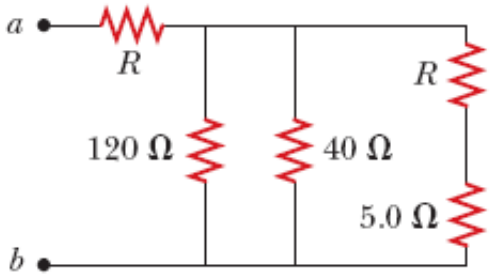
12. –/1 points SERCP11 18.3.P.013.MI. My Notes Ask Your Teacher

The resistance between terminals *a* and *b* in the figure below is 55 Ω. If the resistors labeled *R* have the same value, determine *R*.

*R* = *(No Response)* Ω

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