

# Ch5 Review

Tuesday, October 19, 2021 11:26 AM



## Ch5 Review

Name \_\_\_\_\_

Date \_\_\_\_\_

**Comprehension**  
**Section 10.1-10.2**

Use with textbook pages 302-308.

### True or false?

Read the statements given below. If the statement is true, write "T" on the line in front of the statement. If it is false, write "F" and rewrite the statement to make it true.

1. T An electric circuit is a complete pathway through which electrons can flow.

2. F An electric load transforms light energy into electrical energy.

3. F Light bulbs, heaters, and ~~batteries~~ are all examples of electric loads.

4. T The wire through which electric current flows is a conductor.

5. F A ~~switch~~ battery is the source of electric potential energy in a circuit.

6. T Circuit diagrams use circuit symbols to illustrate actual electrical circuits.

7. F ~~Current~~ Static electricity is charge that remains stationary on an insulator.

8. T Electric current is the amount of charge passing a point in a conducting wire each second.

9. F Electric current is measured in ~~volts~~ Amps.

10. T An ammeter is used to measure the current in a circuit.

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Use with textbook pages 302-308.

## Electric current

Match each Term on the left with the letter on the Diagram on the right. Each letter on the Diagram may be used only once.

Term	Diagram
1. <u>A</u> cell	
2. <u>D</u> bulb	
3. <u>B</u> switch	
4. <u>F</u> circuit diagram	
5. <u>C</u> conducting wire	

Circle the letter of the best answer.

6. What does the symbol represent?

A. a load

B. a battery

C. a voltmeter

D. an ammeter

7. Which of the following are correctly defined?

I. <input checked="" type="checkbox"/>	ampere: unit for electric current
II. <input checked="" type="checkbox"/>	ammeter: device used to measure current
III. <input checked="" type="checkbox"/>	electric circuit: an <u>incomplete</u> pathway through which electrons can flow

A. I and II only

B. I and III only

C. II and III only

D. I, II, and III

8. Which of the following is not an example of an electric load?

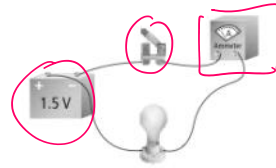
A. a motor

B. a heater

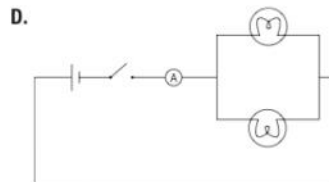
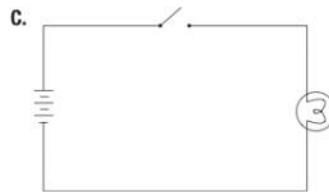
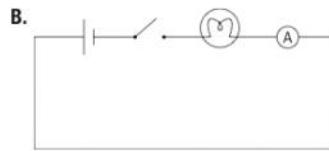
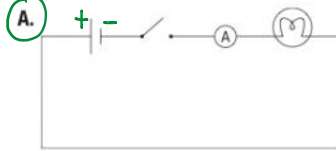
C. a light bulb

D. a generator

Use the following diagram to answer question 9.



9. Which circuit diagram represents the illustration shown above?



Use with textbook pages 315–318.

## Voltage, current, and resistance

Follow the directions below to demonstrate what you know about voltage, current, and resistance.

1. Define the following terms.

$$I = \frac{Q}{t}$$

(a) current amount of charge per second.

(b) voltage amount of Energy per charge  $V = \frac{E}{Q}$

(c) resistance how difficult it is for charges to go through.

(d) Ohm's law  $V = IR$

(e) resistor a device used to reduce the current of the circuit.


2. Complete the following table. The table has been partially completed to help you.

	Current	Voltage	Resistance
Symbol	$I$	$V$	$R$
Unit	Ampere (A)	Volt (V)	ohm ( $\Omega$ )
Meter used for measurement	ammeter	voltmeter	ohmmeter
Formula	$I = \frac{V}{R}$	$V = IR$	$R = \frac{V}{I}$

Use with textbook pages 315–318.

## Calculations with Ohm's law

Use Ohm's law to complete the following table. Write the formula you will use and substitute the known values into the formula. Show all your work and include the correct unit with your answer. The first question has been done to help guide you.

	Question	Show your work	Answer
1.	A current through a resistor in a circuit is 1.5 A. If the potential difference across the resistor is 6 V, what is the resistance of the resistor?	$R = V \div I$ $= 6 \text{ V} \div 1.5 \text{ A}$ $= 4 \Omega$	4 $\Omega$
2.	A toaster is plugged into a 120 V outlet. What is the resistance of the toaster if the current in the toaster is 10 A?	$R = \frac{V}{I} = \frac{120 \text{ V}}{10 \text{ A}} = 12 \Omega$	
3.	A light bulb with a resistance of 30 $\Omega$ is connected to a battery. If the current in the light bulb is 0.2 A, what is the voltage of the battery? 	$V = IR$ $= (0.2 \text{ A})(30 \Omega) = 6 \text{ V}$	
4.	What is the current in a flashlight bulb with a resistance of 24 $\Omega$ if the voltage provided by the flashlight battery is 3 V?	$I = \frac{V}{R} = \frac{3 \text{ V}}{24 \Omega} = 0.125 \text{ A}$	
5.	An electric iron plugged into a wall socket has a resistance of 20 $\Omega$ . If the current in the iron is 6 A, what is the voltage provided by the wall socket?	$V = IR$ $6 \text{ A}(20 \Omega)$	

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Use with textbook pages 315–318.

## Resistance and Ohm's law

Match the Formula or Unit on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Formula or Unit	Descriptor
1. $E \text{ (V)} = V \div R$	A. unit for voltage
2. $F \text{ (A)} = V \div I$	B. unit for current
3. $D \text{ (V)} = I \times R$	C. unit for resistance
4. $A$ volts (V)	D. formula for voltage
5. $C$ ohms ( $\Omega$ )	E. formula for current
6. $B$ amperes (A)	F. formula for resistance

Circle the letter of the best answer.

7. Which of the following correctly matches the devices with what they measure?

	Ammeter	Ohmmeter	Voltmeter
A.	current	voltage	resistance
B.	resistance	current	voltage
C.	voltage	resistance	current
D.	current	resistance	voltage

8. What is the name of the law given to the mathematical relationship between voltage, current, and resistance?

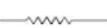
- A. Ohm's law  
B. Voltage's law  
C. Ampere's law  
D. Electricity's law





9. Which of the following describes resistance?

I. <input checked="" type="checkbox"/>	It resists the flow of electrons.
II. <input checked="" type="checkbox"/>	It speeds up the current flow in a circuit.
III. <input checked="" type="checkbox"/>	It causes the electron's electrical energy to be converted to heat and light energy.

- A. I and II only  
B. I and III only  
C. II and III only  
D. I, II, and III
10. Which of the following occurs if resistance is increased in a circuit?

- A. Both voltage and current will increase.  
B. Both voltage and current will decrease.  
C. Voltage will increase and current will decrease.  
D. Voltage will decrease and current will increase.

11. What does the symbol  represent?

- A. a load   
B. a resistor   
C. a voltmeter   
D. an ammeter 

12. A 6 V battery is connected to a 10  $\Omega$  resistor. What is the current flowing in the circuit?

- A. 0.6 A  
B. 1.67 A  
C. 4 A  
D. 60 A

$$I = \frac{V}{R} = \frac{6V}{10\Omega} = 0.6$$

$V = IR$





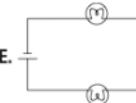
Name \_\_\_\_\_

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Use with textbook pages 320–324.

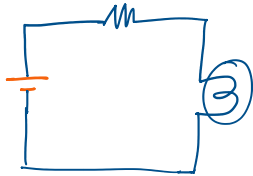
## Is it in series or in parallel?

Match each description on the left with the correct circuit on the right.

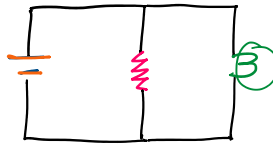
Description	Circuit
1. <u>B</u> 3 resistors in series	A. 
2. <u>D</u> 3 resistors in parallel	B. 
3. <u>E</u> 2 light bulbs in series	C. 
4. <u>A</u> 2 light bulbs in parallel	D. 
	E. 

Draw circuit diagrams as directed below.

5. Draw a circuit diagram showing one resistor and one light bulb in series.



6. Draw a circuit diagram showing one resistor and one light bulb in parallel.



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$$\frac{4\Omega}{4\Omega} \Rightarrow R_T = \frac{4\Omega}{2} = 2\Omega$$

Use with textbook pages 320-324.

### Calculations with series circuits

$$V = IR$$

Use the diagrams to answer the questions below.

$V_T = 30V$   
 $I_T = 3A$   
Resistor 1:  $4.0\Omega$ ,  $I_1 = 3.0A$ ,  $V_1 = ?$   
Resistor 2:  $6.0\Omega$ ,  $I_2 = 3A$ ,  $V_2 = 18V$

$V_T = 18V$ ,  $V_0 = ?$ ,  $I_T = 2A$   
Resistor 1:  $V_1 = 4V$ ,  $I_1 = 2A$   
Resistor 2:  $V_2 = 8V$ ,  $I_2 = 2A$   
Resistor 3:  $V_3 = 6.0V$ ,  $I_3 = 2.0A$ ,  $R_3 = ?$

1. (a) What is the total resistance in the circuit?  
 $R_T = 4 + 6 = 10\Omega$

(b) What is the amount of current flowing through Resistor 2?  
 $3A$

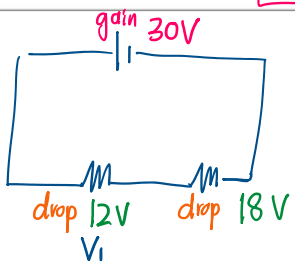
(c) Using Ohm's Law ( $V = IR$ ), determine the voltage drop across Resistor 2.  
 $V_2 = I_2 R_2 = 18V$   
 $3A(6\Omega)$

(d) What is the voltage drop across Resistor 1?  
 $V_T = V_1 + V_2$   
 $30 = V_1 + 18$   $V_1 = 12V$

2. (a) What is the total voltage in the circuit?  
 $V_T = V_1 + V_2 + V_3 = 18V$   
 $4 + 8 + 6$

(b) What is the amount of current flowing through Resistor 2?  
 $I_2 = 2A$

(c) Ohm's law is  $R = \frac{V}{I}$ . Use Ohm's law to determine the resistance of Resistor 3.  
 $R = \frac{V}{I} = \frac{6V}{2A} = 3\Omega$



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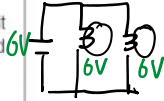
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Use with textbook pages 320–324.

## Series and parallel circuits

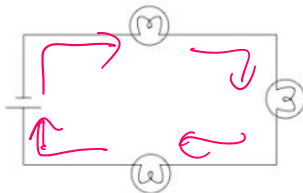
Match each Description on the left with the Circuit on the right. Each Circuit may be used more than once.

Description	Circuit
1. <u>B</u> Resistors decrease the total resistance of the circuit.	A. series circuit
2. <u>A</u> Resistors increase the total resistance of the circuit.	B. parallel circuit
3. <u>A</u> The voltages across each of the loads in the circuit add up to the voltage supplied by the source.	
4. <u>B</u> The voltages across each of the loads in the circuit are equal to each other and to the voltage supplied by the source.	
5. <u>A</u> The current through the whole circuit is the same throughout and is equal to the total current supplied by the source.	
6. <u>B</u> The current through each pathway of the circuit adds up to the total current supplied by the source.	



Circle the letter of the best answer.

Use the following diagram to answer questions 7 and 8.



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7. The light bulbs are connected in parallel.

- A. The statement is correct.
- B. The statement is incorrect.
- C. The diagram does not show whether the statement is correct or incorrect.

8. The current is the same throughout the entire circuit.

- A. The statement is correct.
- B. The statement is incorrect.
- C. The diagram does not show whether the statement is correct or incorrect.

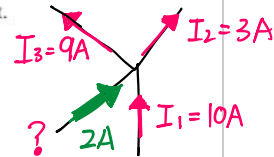
9. Which of the following statements applies to a series circuit?

I.	There are <u>parallel</u> junction points in the circuit.
II. <u>✓</u>	There is only one path for electrons to flow.
III. <u>✓</u>	The total resistance is equal to the sum of the individual resistances.

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II, and III

10. Which of the following applies to a parallel circuit?

- ~~A.~~ There is only one path for electrons to flow.
- ~~B.~~ Adding a resistor to the circuit increases the total resistance.
- C. The sum of the voltages lost on the resistors equals the total voltage supplied by the battery.
- D. The total current entering a junction point must equal the sum of the current leaving the junction point.



$$I_n = 10 + 2 = 12$$

$$Out = 9 + 3 = 12$$