



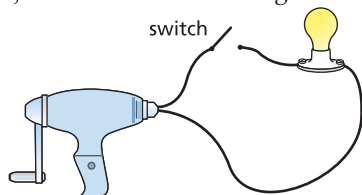
## Physics

## Practice Test

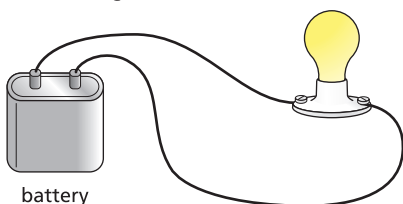
Before you try the Physics Practice Test, you may want to review Sections 1–9, where you will find 35 Checking Up questions, 14 What Do You Think Now? questions, 36 Physics Essential Questions, 94 Physics to Go questions, and 11 Inquiring Further questions.

## Content Review

1. A student is spinning an electric generator to power a circuit, as shown. When the switch is closed, which of the following occurs?

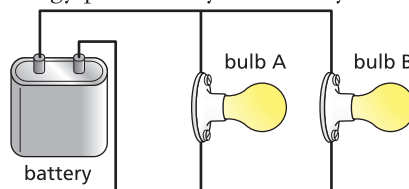


- a) The generator gets easier to turn, and the light goes on.  
b) The generator gets harder to turn, and the light goes on.  
c) The generator gets harder to turn, and the light goes off.  
d) The generator gets easier to turn, and nothing happens to the light.
2. A series circuit delivers energy from the battery to the resistor. As the current flows around the circuit, which of the following does the resistor use up?  
a) charge only  
b) energy only  
c) both charge and energy  
d) neither charge nor energy
3. The circuit in the diagram shows a battery connected to a light bulb. If a second identical light bulb is added in series with the first, which of the following would occur?

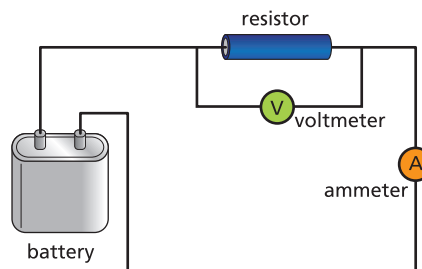


- a) The first bulb would go out, and the second bulb would shine.  
b) The first bulb would stay bright, and the second bulb would be dimmer.  
c) Both bulbs would shine equally, but dimmer than the circuit with one bulb.  
d) Both bulbs would shine equally with the same brightness as the original.

4. Two light bulbs are connected in parallel to a powerful battery, as shown in the diagram. Compared to the energy used in one light bulb, the energy provided by the battery is

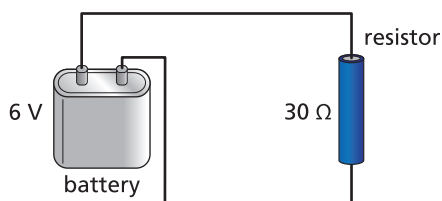


- a) the same.  
b) twice as much.  
c) half as much.  
d) four times as much.
5. In the diagram in Question 4, if bulb A is removed from the circuit, bulb B will  
a) go out.  
b) double in brightness.  
c) remain unchanged.  
d) be half as bright.
6. In the diagram for Question 4, what happens if a third bulb is added in parallel to bulbs A and B?  
a) Bulbs A and B would both become dimmer.  
b) Bulbs A and B would both become brighter.  
c) Bulb A would remain the same, but bulb B would become much dimmer.  
d) Bulbs A and B would maintain the same brightness.
7. The diagram shows a circuit with a resistor, a battery, a voltmeter and an ammeter. Is this circuit connected correctly to measure the resistance of the resistor?

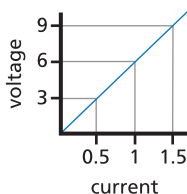


- a) No, both the voltmeter and the ammeter should be connected in series.  
b) No, both the voltmeter and the ammeter should be connected in parallel.  
c) No, the voltmeter and ammeter should change places.  
d) Yes, it is connected correctly.

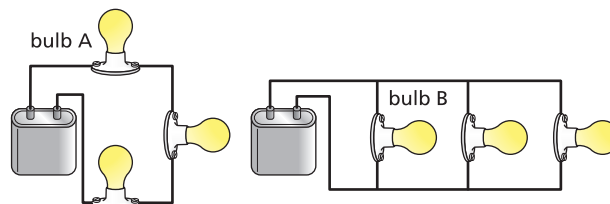
8. In the circuit shown in the diagram, what current is flowing through the resistor when the battery is connected?



- a) 5 A  
b) 5 V  
c) 0.2 A  
d) 0.2 V
9. The graph shows the current through a resistor when different amounts of voltage are applied. The resistance of the resistor is closest to
- a) 1.5  $\Omega$ .  
b) 18  $\Omega$ .  
c) 6  $\Omega$ .  
d) 4  $\Omega$ .
10. An electric clothes dryer requires 5000 W of power. Which combination of circuit voltage and maximum circuit current below would be sufficient to power the dryer?
- a) 110 V and 30 A  
b) 220 V and 20 A  
c) 110 V and 40 A  
d) 220 V and 30 A
11. A mass of 100 g of water at 80°C is added to 200 g of water at 50°C. Which of the statements below best describes the result of this process and the final temperature of the mixture?
- a) The final temperature is 60°C and the entropy of the system increases.  
b) The final temperature is 65°C and the entropy of the system increases.  
c) The final temperature is 60°C and the entropy of the system decreases.  
d) The final temperature is 65°C and the entropy of the system decreases.



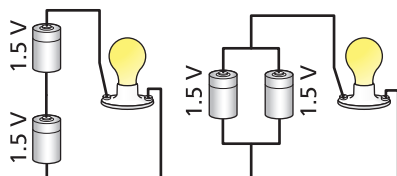
12. Two identical batteries are each connected to identical light bulbs in two different circuits as shown in the diagram. Bulb A is connected in a series circuit, and bulb B is connected in a parallel circuit. Compared to the current flowing in bulb A, the current flowing in bulb B is



- a) three times greater.  
b) one third as great.  
c) the same.  
d) No current comparison can be made between two different circuit types.
13. In *Question 12*, if the resistance of each bulb is 6  $\Omega$ , what is the ratio of resistance in the series circuit to the resistance in the parallel circuit?
- a) 1:1  
b) 3:1  
c) 6:1  
d) 9:1
14. A heater that uses 120 V and 2 A is placed in a cup of water for 30 s. The temperature of the water rises 20°C during this process. How much electrical energy does the heater use in this time?
- a) 7200 J  
b) 240 J  
c) 144,000 J  
d) 360 J
15. A microwave oven that is rated at 1000 W increases the energy of 800 g of water by 24,000 J in 30 s. What is the efficiency of the oven?
- a) 80%  
b) 75%  
c) 60%  
d) 100%

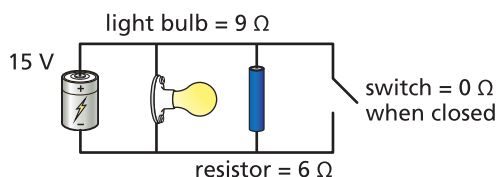
**Practice Test** (continued)**Critical Thinking**

16. Look at the following set of circuit diagrams – one has two equal batteries in series and the other has two equal batteries in parallel.



- Compare the voltage each bulb receives.
  - Compare the current each bulb receives.
  - If the bulb has a resistance of  $12\ \Omega$ , calculate the current in each bulb.
17. A 120-V circuit for the kitchen of a home is protected by a 20-A circuit breaker. The kitchen has the following appliances that may be plugged into the circuit:
- |                     |                     |
|---------------------|---------------------|
| • 1000-W toaster    | • 300-W blender     |
| • 1200-W frying pan | • 600-W coffeemaker |
- What current flows through the blender when it is plugged in?
  - What is the resistance of the frying pan?
  - What combinations of appliances can be used on the circuit at the same time without the circuit breaker shutting off the circuit?
18. In an experiment, 500 g of water at  $60^\circ\text{C}$  was cooled to  $50^\circ\text{C}$  by adding cold water.
- How much heat was lost by the hot water? (Use  $c = 4180\ \text{J/kg}\cdot^\circ\text{C}$  for water)
  - How much heat was gained by the cold water?
  - The temperature of the cold water was  $10^\circ\text{C}$ . How much cold water was added to the hot water to bring the temperature down to  $40^\circ\text{C}$ ?
19. A water immersion heater is rated at 600 W when plugged into a 120-V circuit. The heater is placed in a cup with 0.400 kg of water at an initial temperature of  $10^\circ\text{C}$ .
- How much current does the heater draw?
  - What is the resistance of the heater?
  - If the heater runs for 30 seconds, how much energy does it provide to the water?
  - What is the final temperature of the water after 30 seconds? (Use  $c = 4180\ \text{J/kg}\cdot^\circ\text{C}$  for water)

20. For the circuit shown in the diagram:

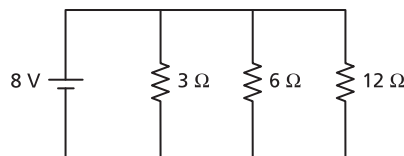


- What is the voltage across the light bulb?
- What is the current through the resistor?
- What is the resistance of the circuit when the switch is open?
- Describe what happens to the light bulb when the switch is closed.

Active Physics

*Plus*

21. A 60-W and a 100-W light bulb are both plugged into the same circuit. Using calculations, show which light bulb has the greater resistance.
22. A 100-kg mass is connected to a string that is attached to paddles in an insulated container of water, as shown. As the mass falls, the water is stirred, heating it.
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- If the mass falls 5 m, how much gravitational potential energy does it lose?
  - If the container has 0.5-kg of water inside, what is the maximum temperature increase of the water due to the falling mass?
23. For the circuit shown in the diagram:



- Find the total circuit resistance.
- Find the current through the  $6\text{-}\Omega$  resistor.
- Find the power used in the  $3\text{-}\Omega$  resistor.