

Mixed Review*Current and Resistance*

1. A 60.0 cm metal wire draws 0.185 A from a 36.0 V battery. Will the current increase or decrease when the following changes are performed? Explain whether the change is due to a change in resistance, a change in potential difference, or other reasons.

a. The wire is cut into four pieces, and only one segment is used.

b. The wire is bent to form an *M* shape.

c. The wire is heated to 500°C.

d. The 36.0 V battery is replaced by a 24.0 V battery.

2. A 25 Ω resistance heater is connected to a potential difference of 120 V for 5.00 h.

a. How much current does the heater draw?

b. How much electric charge travels through the heating element during this time?

c. What is the power consumption of the heater?

d. Use the power and time to calculate how much energy was consumed.

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3. The label on a three-way light bulb package specifies 100 W, 150 W, 250 W, 120 V.

a. How much current does the light bulb draw in each of the three ways? (Assume three significant figures in each of these measurements.)

b. What is the bulb's resistance in each way?

c. Compare the cost of using the light bulb for 100.0 h in each way. (Assume that the price is 7.00 ¢/kWh.)

4. An electric hot plate draws 6.00 A of current when its resistance is 24.0 Ω.

a. What is the voltage across the hot plate's heating element?

b. How much power does it consume?

c. For what length of time should it be kept on in order to supply 9×10^4 J to a coffeepot? (Assume that all electrical energy is transferred to the coffeepot by heat.)

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