

3.10 Case Study Electrical Resistance

Report

How I Am Being Assessed _____

- (a) Resistance changes electrical energy into one of four forms of energy. What are they?

- (b) Define voltage drop. What unit is used to measure voltage drop?

- (c) Define current. What unit is used to measure current?

- (d) How do you think resistance affects electrical devices?

- (e) Look at **Table 1**. Notice that the voltage drop does not change. What pattern do you notice for current and resistance?

Table 1 Resistance of Some Electrical Loads

Ohm's Law	V	=	I	×	R
Load	Voltage drop (V)		Current (A)		Resistance (Ω)
light bulb (60 W)	120		0.50		240
coffee grinder	120		1.20		100
food dehydrator	120		4.60		26
toaster oven	120		14.0		8.6

Look at the circuit shown in **Figure 7** on page 152 of your textbook. The resistor in the diagram has a resistance of $10\ \Omega$. The ammeter reads 2 A. The voltage drop is constant.

- (f) Will the ammeter reading go up or down if a $5\ \Omega$ resistor replaces the $10\ \Omega$ resistor?

- (g) Complete the sentence. If the voltage drop is constant and the resistance increases, the current _____. If the voltage drop is constant and the resistance decreases, the current _____.

3.10 Case Study

Electrical Resistance

Questions

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Understanding Concepts

1. Why are electric circuits important?

2. What is electrical resistance?

3. Define, in your own words, a conductor and a resistor.

4. Does the wire in the electrical cord of an electric kettle have a higher or lower resistance than the heating element inside the kettle? Explain your answer.

5. Which of the two circuits on page 153 of your textbook will have the greatest current? Explain why.

Making Connections

6. Outline four examples each of devices that transform electrical energy into:

(i) heat

(ii) light

(iii) sound

(iv) mechanical energy
