



Unit 5F Ohm's Law *Practice Problems*

Date:

Work each of the following problems. SHOW ALL WORK.

1. Before leaving your house in the morning, you add some stew ingredients to your slow cooker and turn it on low. The slow cooker has a 160 Ω resistor and is plugged into a 120 V outlet. When you come home 8 hours later, how much charge has passed through the slow cooker circuit in that time?

2. A medical imaging device shoots 8 million electrons per second through an Ohmic gas. The electrons are motivated by a 3000 V potential difference. What is the effective resistance of the gas?

3. While out in the woods filming a documentary about timber rattlesnakes, your video camera runs out of batteries. Knowing that the camera draws 0.25 A of current and has an overall resistance of 72 Ω, what voltage supply does it need? Will your last six-pack of 9 V batteries do the job?



Unit 5F Ohm's Law *Practice Problems*

Name:

Date:

Work each of the following problems. SHOW ALL WORK.

4. To help keep cool during the summer months, you decide to design and build your own hand-held fan. The fan's electrical circuit will run on four AA batteries (1.5 V each) and must not exceed 50 mA of current. You search online and find that resistors are sold in five varieties: 5 Ω, 10 Ω, 12 Ω, 20 Ω, and 50 Ω. Each resistor costs 8 cents. What set of resistors should you buy to minimize cost?

5. As part of a SpaceX engineering team that is designing microcircuitry to control rocket launch angle, you must assess the power budget needed to operate four fin-control systems. Each system requires 0.16 mA for circuits with 3.4 mΩ of resistance. How much total voltage is needed to supply these circuits?

- a. A b. B c. C d. D
- 6. Which of the following materials (A, B, C, D) are Ohmic? Circle all that apply.

questions continued on next page Unit 5F Practice Problems STUDENT

Copyright © 2018 Georgia Public Broadcasting. All rights reserved. Use or distribution by an unintended recipient is prohibited.



Unit 5F Ohm's Law *Practice Problems*

Name:

Date:

Work each of the following problems. SHOW ALL WORK.

7. In an electrical circuit, what happens to the current flowing through the wire if the initial voltage of 18 V is doubled, and the initial resistance of 35 Ω is reduced by a factor of four?

8. This graph shows the relationship between current and voltage for an unknown metal. What is the resistance of the metal?



9. If a current of 1.1 A flows through a 7 Ω resistor of length 3 m, what is the electric field strength inside the resistor?