

Name: _____ Date: _____

Activity 15

Objective:

Upon completion of this activity sheet you should be able to use Ohm's law to determine unknown electrical values.

NATEF mathematics-related academic skills covered In this activity sheet:

- Use conventional symbols (E for voltage, etc.) to solve circuit parameter calculations using formulas such as Ohm's Law, $E=IR$.
- Multiply whole numbers, fractions, or decimals to arrive at a solution for comparison with the manufacturer's specifications.
- Divide decimals to determine measurement conformance with the manufacturer's specifications.

This activity sheet also covers, wholly or partially, the following NATEF science skills:

- Explain and demonstrate an understanding of the use of Ohm's Law in verifying circuit parameters (resistance, voltage, amperage).

Tools and Materials:

Pen or pencil

PROCEDURE:

1. You are asked to determine the amount of current that would be drawn through a set of add-on fog lights. You measure the resistance of the light filaments and get a reading of 10 ohms. If the vehicle has a 12 volt electrical system, how much amperage would the lights draw?
2. What is the electrical symbol for resistance? _____

For voltage? _____

For amperage? _____
3. When the vehicle engine is not running, electrical system voltage is slightly over 12 volts. When the engine is running, electrical system voltage is between 13 and 13.5 volts. Would a vehicle electrical circuit with a resistance of 5 ohms draw more or less current when the engine is running compared to when the engine is off? _____
4. If an operating circuit in a 12 volt vehicle has a amperage draw of 4 amps, its resistance must be _____ ohms.

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5. Supply the unknown electrical value.

a. 3 volts, 5 amps R = _____

b. 3 volts, 1.5 ohms A = _____

c. 7 ohms, 7 amps V = _____

d. 12 volts, 6 amps R = _____

e. 48 amps, 12 volts R = _____

6. If electrical resistance increases as the electrical components heat up, when would the amperage draw through a circuit be the lowest? (Circle the correct answer.)

- a. When the circuit components are cold.
- b. When the circuit components are hot.
- c. When some circuit components are hot while others are still cold.
- d. Heat has no effect on current flow.

7. How would changes in vehicle charging system voltage affect the resistance of a component such as a headlight? (Circle the correct answer.)

- a. Resistance would increase.
- b. Resistance would decrease.
- c. Resistance would be unaffected.

Activity successfully completed. Yes ___ No ___

Grade (if applicable) _____