

OHM'S LAW

1. How much current flows in a 1000-ohm resistor when a voltage of 1.5 V is impressed across it?

$1.5 \times 10^{-3} \text{ Amps}$ $I = \frac{V}{R} = \frac{1.5}{1000}$

2. If the filament resistance in an automobile headlamp is 3 ohms, how much current does it draw when connected to a 12-V battery?

4.0 Amps $\frac{V}{R} = \frac{12}{3}$

3. The resistance of the side lights on an automobile is 10 ohms. How much current flows in them when they are connected to a 12-V battery? 1.2 Amps $\frac{12}{10}$

4. What is the current in the 30-ohm heating coil of a coffee maker that operates on a 120-V circuit?

4.0 Amps $\frac{V}{R} = \frac{120}{30} = 4.0$

5. During a lie detector test, a voltage of 6 V is impressed across two fingers. When a certain question is asked, the resistance between the fingers drops from 400 000 ohms to 200 000 ohms. What is the initial current through the fingers, and the current when the resistance between them drops?

$\frac{6}{400,000} = 1.5 \times 10^{-5} \text{ A}$ $\frac{6}{200,000} = 3 \times 10^{-5} \text{ A}$

6. How much resistance allows an impressed voltage of 6 V to produce a current of 0.006 A? $R = 1000 \Omega$

$6 = .006 R$

7. What is the resistance of a clothes iron that draws a current of 12 A at 120V? 10Ω $120 = 12R$

8. What is the voltage across a 100-ohm circuit element that draws a current of 1 A? 100 Volts $V = IR = 1(100)$

9. The current in an incandescent lamp is 0.5 A when the lamp is connected to a 120-V circuit, and 0.2 A when it is connected to a 10-V source. Does the resistance of the lamp change in these cases? Explain your answer and defend it with numerical values.

$120 / .5 = 240 \Omega$
 $10 / .2 = 50 \Omega$

