Name _____ Date _____ Period _____

ZornScience
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Current, Voltage, and Resistance

Physics

Part A: Concepts

1. For each description, write **current**, **voltage**, or **resistance**.

a. the energy a battery gives to each coulomb of charge
b. the number of coulombs passing a point each second
c. how strongly a material opposes the flow of charge
d. measured in amperes (A)
e. measured in ohms (Ω)
f. in the water analogy, the narrow section of pipe
g. in the water analogy, the push from the pump

2. The four wires below all have the same temperature. Rank them from **least** to **most** resistance, and give a reason for each step in your ranking.

A copper, 1 m
B copper, 2 m
C copper, 2 m (thin)
D nichrome, 2 m (thin)

Part B: Current

Use $I = q/t$. Show your knowns, equation, substitution, and answer with units.

3. A total charge of 18 C flows through a portable speaker in 12 s. What is the current in the speaker?

4. A phone charger delivers a current of 2.0 A for 15 minutes. How much charge flows into the phone? (Hint: change the time to seconds first.)

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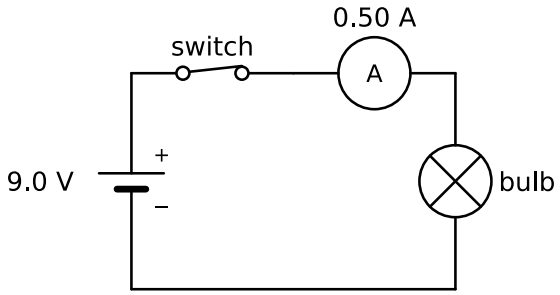
5. A desk lamp bulb carries a current of 0.80 A. How long does it take for 240 C of charge to pass through it? Give your answer in seconds and in minutes.

Part C: Voltage

Use $\Delta V = PE/q$.

6. A battery pack gives 27 J of energy to 6.0 C of charge. What is its voltage? The pack is made of 1.5 V cells. How many cells does it hold?

7. Ana's flashlight circuit is shown. The ammeter reads 0.50 A, and she leaves the flashlight on for 60.0 s.



a. How much charge passes through the bulb?

b. How much energy does the battery give to that charge?

c. Ana swaps in a bulb with more resistance. What happens to the current? Explain.

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