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Science 9

Physics Review

Chapter 9: Static Electricity

1. Fill in the missing information:

   like charges REPEL, unlike charges ATTRACT. Neutral objects are ATTRACTED to charged objects because of INDUCTION.

2. How would you use the electrostatic series to determine the resulting charges if two materials were rubbed together? material lower down gives away electrons, becomes positive

3. What charge will each of the following have after being rubbed together:

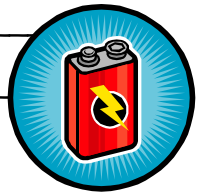
   plastic wrap − and amber +

   Cotton + and ebonite −

4. How is an insulator different from a conductor? conductor allows electrons to flow freely, insulator doesn't

5. State Coulomb's Law in your own words: electric force gets larger as charges get bigger and/or closer together

6. Describe one application of static electricity. lightning, laser printer



Chapter 10: Current Electricity

1. Describe the difference between static charges and current electricity: static is a buildup, current is controlled flow of charges

2. What are the main parts of a circuit? source load switch

3. How is a cell different from a battery? battery is two or more cells in series

4. What does electric current refer to? electrons flowing through wire

5. Fill in the missing information:

   conventional current flows from positive to negative, but electron flow is from − to +. When devices are connected

in a series circuit, the current must travel through every device in sequence. When devices are connected in parallel, the current splits and some goes through each device.

Ammeters, used to measure current, are connected in series. Voltmeters, used to measure voltage, are connected in parallel.

Use the equation I = Q/t for the following questions (show all your work).

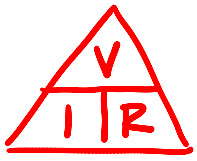
6. How much charge passes a point in 2 minutes if 1.5 A of current flows through a wire?

$Q = It$ $Q = (1.5)(120) = 180\ C$

7. What is the current in a circuit if 25 C of charge pass a point in 45 seconds. Give your answer in milliamps. $I = \frac{Q}{t}$ $I = \frac{25}{45} = 0.55\ A$ $556\ mA$

8. What does a resistor do? opposes the flow of current

9. Draw the Ohm's Law triangle.



10. A flashlight uses two 1.5V cells in series. The current in the bulb is 280mA. What is the **resistance** of the bulb? $R = \frac{V}{I}$ $R = \frac{3}{0.280} = 10.7\ \Omega$	11. A 22 Ω resistor has a voltage of 3.5V. What is the **current** in the resistor? $I = \frac{V}{R}$ $I = \frac{3.5}{22} = 0.159\ A$
12. What is the total resistance (R_T) when a 40 Ω resistor is connected in series with a 70 Ω resistor? $R_T = 40 + 70 = 110\ \Omega$	13. What is the **voltage** of a battery if there is a current of 200 mA in a 50 Ω resistor? $V = IR$ $V = (0.2)(50) = 10\ V$

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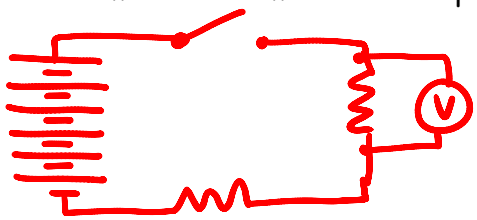
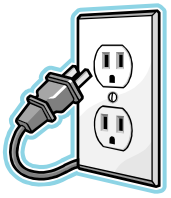
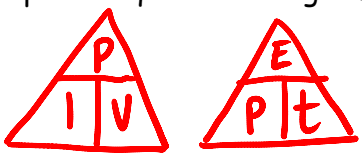
14. Draw the diagram of a circuit that has a 9.0 **battery** connected to a switch and two resistors in parallel. Include a voltmeter that measures the potential difference across one of the resistors.





Chapter 11: Using Electricity

1. Work is the transforming or converting of energy and is measured in Joules (J).
2. An object has Energy (E) if it has the ability to do work. There are 2 main classes of energy: potential (stored) energy and kinetic (motion) energy.
3. Power (P) is the rate at which energy is transformed or the rate at which work is done and is measured in watts (W)
4. Draw the 2 power equation triangles.



5. A car headlight has a power rating of 45W. How much **energy** does it use in 25 minutes? $E = Pt \quad E = (45)(1500)$ $E = 6.75 \times 10^4 J$	6. A car battery produces 5000W of energy to start a car. If the car uses 2000J to start, how much **time** does it take to start the car? $t = \frac{E}{P} \quad t = \frac{2000}{5000}$ $t = 0.04 s$
7. A solar cell produces 1.8A of current at 4.2V. What is the **power** rating of the solar cell? $P = IV \quad P = (1.8)(4.2)$ $P = 7.56 W$	8. What is the **current** in a 95W TV connected to a 120V household outlet? $I = \frac{P}{V} \quad I = \frac{95}{120}$ $I = 0.792 A$

9. A 37W cordless drill uses a current of 2.6A. What is the **voltage** of the battery?

$V = \frac{P}{I}$ $V = \frac{37}{2.6}$

$V = 14.2\ V$

10. A bulb has a current of 0.5A when connected to a 120V outlet. If the light is left on for 30 min, how much **energy** is used?

$P = IV$ $P = (0.5)(120) = 60W$

$E = Pt$ $E = (60)(1800)$

$= 1.08 \times 10^5\ J$

11. What units measure energy use in your house? kilowatt hours (kWh)

12. To determine monthly energy usage, the reading at the end of the month is subtracted from the reading at the start of the month.

13. A house uses 250 kWh in a month. If the electric company charges $0.075/kWh, how much did the energy **cost** for the month?

$250 \times 0.075 = \$18.75$

14. Complete the table below:

Variable	Variable Symbol	Unit	Unit Symbol	Measuring Device
voltage	V	volt	V	voltmeter
Current	I	amp	A	ammeter
Resistance	R	ohm	Ω	ohmmeter
Energy	E	joule	J	n/a
Work	W	joule	J	n/a
Power	P	watt	W	n/a