

Name: _____

Period: _____

Electricity In Class Review

1. A) A $24 \mu\text{C}$ charge and a $-1.2 \mu\text{C}$ are 6 mm away from each other. Calculate the force between them.

$$F = 9 \times 10^9 \frac{(24 \times 10^{-6})(1.2 \times 10^{-6})}{.006^2} = 7200 \text{ N}$$

- B) Will the two charges attract or repel each other?
 C) If the $24 \mu\text{C}$ charge touches ground what will happen?
electrons flow to it from ground
 D) If the distance between them is doubled, by how much does the force change? $\frac{1}{4}$ (r is sq.)
 E) If one of the charges was halved, by how much does the force change? $\frac{1}{2}$

2. If an object is negative, did it gain or lose electrons?

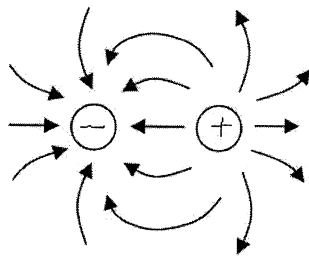
3. How much charge do 25 electrons have?
 $\frac{25e}{1} \left(\frac{1.602 \times 10^{-19} \text{ C}}{1e} \right) = -4 \times 10^{-18} \text{ C}$

4. An object has a charge of $-3.2 \mu\text{C}$ object. How many electrons did it gain or lose?

$$\frac{-3.2 \times 10^{-6} \text{ C}}{1} \left(\frac{1e}{-1.609 \times 10^{-19} \text{ C}} \right) = 2.0 \times 10^{13} e \text{ gained}$$

5. Why can an object not gain a charge equal to 15.6 electrons?
can't have part of e

6. By the direction of the electric field, decide if the charges are positive or negative.
attract



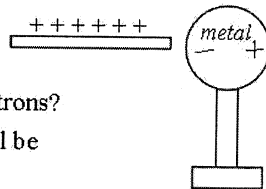
7. When do two charges attract each other?
opp. charges

8. A. Will the two charges attract or repel each other?

- B. To increase the potential energy between the two charges, should you pull them apart or push them together?



9. A positively charged rod is brought close to a conducting sphere.



- A. Did the rod gain or lose electrons?
 B. Which side of the sphere will be negative? *left*

10. Decide which of the wires has the most resistance.

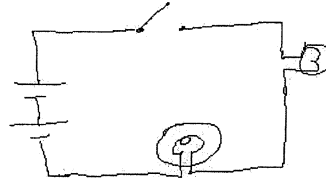
- A. A wire at 5°C OR a wire at 15°C . *hotter*
 B. A thick 2m wire OR a thick 2cm wire. *longer*
 C. A thick 2cm long wire OR a thin 2cm long wire?
 D. A wire made of silver OR a wire made of copper?

11. What do we call a substance with no resistance at very low temperatures?
superconductor

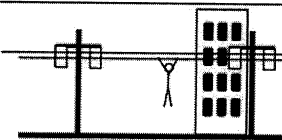
12. Comparing circuits to water: resistor, battery, switch, wire, light bulb, diode, or capacitor?

- A. *battery* A water pump.
 B. *wire* A pipe.
 C. *switch* A valve or faucet.
 D. *light* A water wheel (does something useful).
 E. *capac.* A water tower (gives temporary pressure).
 F. *resis* A restriction in a pipe.
 G. *diode* A one-way valve.

13. Draw a circuit with 2 batteries, a switch, and two light bulbs in series.



14. Slim Jim falls off of a building and grabs onto a power line to save himself.



- A. Give two reasons why he is safe.

1) Both hands are at the same voltage, so no voltage difference. 2) wire is less resistance than Jim (short circuit)

- B. Why would touching the ground be bad?
Then there is a difference of voltage - ouch!

15. Fuse or circuit breaker?

- A. *CB* Can be reset.
 B. *Both* Protects against too much current.
 C. *Fuse* Must be replaced.

16. Which switches would need?

- A. For only resistor 2 to be on?
B, F, D

- B. To short circuit the battery?
C, D

- C. For only resistors 1 and 2 to be on?

*A, G, B, F, D
 1 and 2 would be in parallel*

