

FPS - Chapter 20 - Unit 6 Review

Name _____ Period _____

1. Define the following terms:

a. Electric Charge

b. Electric Force

c. Electric field

d. Static electricity

e. Coulomb

f. Law of Charges

opposites attract, like repel

g. Law of Conservation of Charge

h. Charge by contact

i. Charge by induction

j. Charge by friction

k. Static Discharge

l. Lightning

m. Electric current

n. Direct current

o. Alternating current

p. Conductor

q. Insulator

r. Resistance

s. Potential difference

t. Voltage

u. Ampere

v. Battery load

w. Ohm's Law

x. Electrical circuit

y. Series circuit

z. Parallel circuit

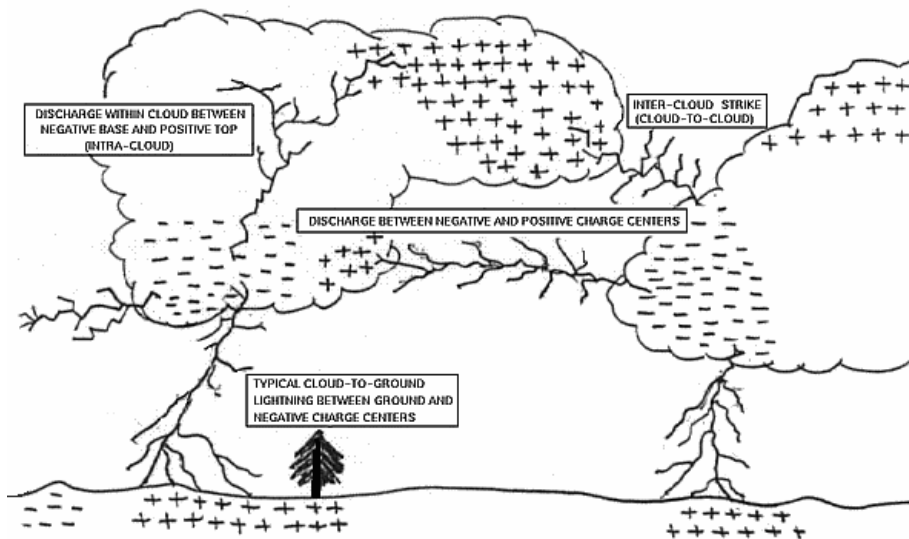
2. What is a cation and how does a neutral atom "become" a cation?

Cation is a positively-charged ion, by loss of electron

3. What is an anion and how does a neutral atom "become" an anion?

Anion is a negatively charged ion, by gaining an electron

4. What are the three subatomic particles? What are their charges?
 Electron - negatively charged particles in outside orbits, transferred during charging
 Proton - positively charged particles in nucleus
 Neutron - neutrally charged particles in nucleus
5. Describe what occurs when a balloon is rubbed with a piece of wool.
 Electrons are transferred from the wool to the balloon by friction. The balloon becomes negatively charged.
6. Refer to #5. What occurs when that charged balloon is held by uncharged scraps of paper?
 The balloon becomes negatively-charged. By induction, the scraps of the paper become positively-charged (with an induced charge) near the balloon. The attraction overcomes the repulsion, and the scraps are attracted to the balloon and "stick" to the balloon.
7. Why does lightning occur? Use a diagram to support your answer.



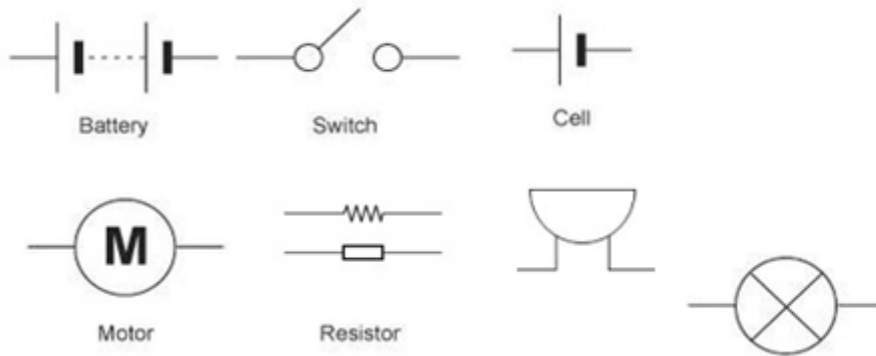
Electrons transferred from charged cloud to the charged ground. LARGE static discharge.

8. How is alternating current different from direct current?
 Alternating current reverses direction constantly while direct current goes only in one direction.
9. Why does a conducting wire sometimes heat up? How does a plastic insulator prevent damage?
 The kinetic energy of collisions of the particles in the wire sometimes converts into thermal energy and is "lost" as heat. Depending on the amount of thermal energy converted, much heat can be transferred into the surrounding. The plastic insulator around things like wiring prevent burning from excess heat.
10. What factors affect resistance?
 Thickness of wire, length of wire, temperature
11. What are the SI units for charge, current, voltage, and resistance?
 Charge = coulomb
 current = ampere
 voltage = volt
 resistance = ohm

12. Describe what will happen to a circuit in which the resistance is doubled.

In a circuit, if the resistance is doubled, the current is halved as the voltage remains constant.

13. Draw the schematic symbols for a one cell battery, two cell battery, open and closed switch, bulb, resistors, motors, and buzzer.



14. What are the differences between series and parallel circuits?

Series circuits → the bulbs or resistors are all on the same branch of the circuit and the current must pass through each bulb along the same path.

Parallel circuits → the bulbs or resistors are on parallel, separate branches of the circuit and the current has multiple paths

15. A circuit has 20 ohm resistance and 40 amp current. What is the voltage?

$$V = IR = (40)(20) = 800 \text{ V}$$

16. A circuit has 2 bulbs with 5 ohm resistance each and 60 volt battery. What is the current?

$$I = V/R = (60)/(5+5) = 6 \text{ A}$$

17. A circuit has a 300 amp current with a 4 volt battery. What is the resistance?

$$R = V/I = (4)/(300) = 0.013333 \text{ ohm}$$

18. Draw the simple circuits described. Label the charges on the batteries, the conventional current flow AND the electron flow. A circuit has 3 buzzers in series with a two cell battery and a closed switch.

19. Draw the simple circuits described. Label the charges on the batteries, the conventional current flow AND the electron flow. Draw a circuit with 3 bulbs in parallel, two resistors NOT in parallel, a two cell battery and a closed switch.

20. Draw the simple circuits described. Label the charges on the batteries, the conventional current flow AND the electron flow. Draw a circuit with 3 bulbs in parallel, one motor (not in parallel), a two cell battery, and an open switch.

21. Solve for the unknown variable in the following diagrams.

