

Ch 32 - Electrostatics Reading Guide (KEY) Name _____ Block _____

1. Electrostatics represents electricity at rest. (p. 500)
2. Electricity is a force acting on you all the time, much like gravity. (P. 501)
3. What is charge? Electrons are attracted to protons, but electrons repel other electrons. This attracting and repelling behavior is attributed to a property called charge. (p. 501)
4. Summary of 4 properties of atoms: (P. 501)
 - *every atom has a positively charged nucleus.
 - *all electrons are identical with the same mass and charge.
 - *a proton has nearly 2000 x the mass of an electron.
 - *atoms usually have as many electrons as protons giving them no net charge.
5. What is the fundamental rule at the base of all electrical phenomena? Like charges repel; opposite charges attract. (p. 501)
6. A charged atom is called an ion. (P. 503)
7. Which electrons in an atom are bound loosely? The outermost electrons (P. 503) (AKA Valence electrons)
8. Summarize the conservation of charge into a single sentence: (P. 504ish) You cannot create or destroy charge; you can transfer charge by moving electrons, but you cannot create or destroy charge.
9. The formula for Coulomb's law is $F = K \frac{q_1 q_2}{d^2}$. What does each letter stand for? (p. 505)
 - k = Proportionality constant (9,000,000,000 N•m²/C² or 9.0 x 10⁹ N•m²/C²) (list the value)
 - q = Charge (Coulombs) and d = Distance (m)
10. What is the SI unit for charge? Coulombs (p. 505)
11. What makes something a good conductor, and list an example. Electrons are more easily moved in some materials than others. Outer electrons of the atoms in a metal are not anchored to the nuclei of a particular atom, but are free to roam the material. Such materials are good conductors for the motion of electric charge for the same reason they are good conductors of heat. This is because their electrons are "loose." (P. 508)
12. What is an insulator? Give an example. Insulators are poor conductors of charge. Rubber and glass are examples of conductors that do not allow charge to flow easily. (p. 508)
13. What is an example of a semiconductor and what are they used in? Semiconductors are materials (like silicone, used in electronic chips) that can behave sometimes like an insulator and sometimes like a conductor. Thin layers of semiconducting material can make a transistor. (P 509).
14. What temperatures do superconductors work best? At temperatures near absolute zero, certain materials acquire infinite conductivity (zero resistance to the flow of charge). These materials are called superconductors. (P. 509)
15. What are 3 ways to charge on object? (P. 509-510) you can charge an object by friction, contact, and induction.
16. What does induction mean? (P. 510) Induction means "to induce." This means that it caused the charge within a material to shift and polarize without touching it.
17. When does charging by induction commonly occur? (p. 511) Charging by induction commonly occurs during thunderstorms. The negatively charged bottoms of clouds, induce a positive charge in the surface of the earth below.
18. What does it mean to say that something is electrically polarized? (p. 512) When one side of an atom or molecule is induced to be slightly more positive (or negative) than the opposite side, the atom or molecule is said to be electrically polarized. If a charged object is negative, then the positive side of another object will be attracted towards that object. When a material polarizes because of an induced charge it is attracted to another material, even though the object remains neutral.