Name _____ Date _____ Period _____

Electric Force and Coulomb's Law Worksheet I   / 39

1. How many electrons have a charge of one Coulomb?   [6.25 x 10^{18} e⁻]

2. Gravitational forces are always attractive. Explain how electrical forces (which are found using Coulomb's Law) are different. [own answer – think of formula's]

3. Calculate the electric force between two point charges that are separated by 0.1 m.
    $q1$ = +0.2 C and $q2$ = +0.4 C   [7.2 x 10^{10} N]

4. The electron and proton of a hydrogen atom have an average separation of 5.3 x 10^{-11} meters. Calculate the gravitational force (F_g) and electric force ($F_{electric}$).
    [F_g = 3.61x10^{-47} N ; F_e = 8.2x10^{-8} N]

5. Calculate the electrical force between two protons in the nucleus of a helium atom when separated by 2.0 x 10^{-15} m. [57.6 N]

6. A balloon rubbed against denim gains a charge of -8.0 µC. What is the electric force between the balloon and the denim when the two are separated by a distance of 5.0 cm? (Assume that the charges are located at a point.) [-230.4 N]

7. Two identical conducting spheres are placed with their centers 0.30 m apart. One is given a charge of +12 x 10^{-9} C and the other is given a charge of -18 x 10^{-9} C.
   a. Find the electric force exerted on one sphere by the other. [-2.16x10^{-5} N]
   b. The spheres are connected by a conducting wire. After equilibrium has occurred, find the electric force between the two spheres. [9x10^{-7} N]

8. A small cork with an excess charge of +6.0 μC (1μC = 10^{-6}C) is placed 0.12 m from another cork that carries a charge of -4.3 μC.
   a. What is the magnitude of the electric force between the corks? [16.125 N]
   b. Is this force attractive or repulsive? [✌◆◆□☺♏◆⌘✦♍]
   c. How many excess electrons are on the negative cork? [2.69 x 10^{13} e⁻]
   d. How many electrons has the positive cork lost? [3.75 x 10^{13} e⁻]

9. Two electrostatic point charges of +60.0 μC and +50.0 μC exert a repulsive force on each other of 175N. What is the distance between the two charges? [0.393 m]

10. How many electrons must be removed from a neutral, isolated conducting sphere to give it a positive charge of 8.0 x 10^{-8} C? [5 x 10^{11} e⁻]