Coulomb's Law I

General Electrostatic Questions

1. Charge is measured in units of _____. 1 μC is equivalent to _____C.

2. Two like charges will _____ and two opposite charges will _____.

3. The charge of a proton is _____.

4. The charge of an electron is _____.

5. Why is it impossible for an object to have a charge of -1×10^{-19} C?

6. When a vinyl strip is rubbed with fur, 1,000,000 extra electrons are deposited on the strip. What is the charge on the strip?

Coulomb's Law Questions

7. What is Coulomb's Law?

8. A sphere with a charge of +0.0004 C is placed 1 m away from a sphere with a charge of –0.00004 C. Will these charges attract or repel? What is the force between them?

9. How far apart are two identical charges of 2.5×10^{-6} C if the force between them is 0.5 N?

10. A –3.2 μC charge is placed 25 cm away from a charge of +5.0 μC.
    a. What is the force on the –3.2 μC charge?

    b. What is the force on the +5.0 μC charge?

11. Two Styrofoam peanuts have somehow become charged. The peanuts each have a charge of -5×10^{-8} C and they are 3 cm apart.
    a. What is the force of repulsion between them?

    b. How many electrons are on each peanut?

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12. Two raindrops have become charged. One raindrop has somehow gained one million extra electrons. The second raindrop has gained 3 million extra electrons. If the two raindrops are only 0.01 meters apart, what is the force of repulsion between them?

13. The radius of a hydrogen atom is about 5×10^{-11} meters, and can be thought of as an electron orbiting a proton nucleus. What is the electrostatic force of attraction between the two particles?

14. Two metal spheres have identical charges on them. They are separated by 0.25 meters and the force of repulsion them is 0.007 N. What is the charge on each sphere?

15. If the distance between 2 charges were doubled, what would happen to the force between them?

16. If the distance between 2 charges were cut in half, what would happen to the force between them?

17. If the magnitude of one charge were doubled, what would happen to the force between them?

18. If the magnitude of one charge were doubled and the magnitude of the other charge tripled, what would happen to the force between them?

19. If the distance between two charges were tripled and the magnitude of one of the charges quadrupled, what would happen to the force between them?

Answers
1) Coulombs; 10^{-6} 2) repel; attract 3) $+1.6 \times 10^{-19}$ C 4) -1.6×10^{-19} C
5) not an integer multiple of #3 or #4 6) 1.6×10^{-13} C 8) (–)144 N , attract 9) 0.34 m
10. a) -2.3 N b) –2.3 N 11. a) 0.03 N b) 3.13×10^{11} electrons 12) 6.9×10^{-12} N
13) (–)9.2×10^{-8} N 14) 2.2×10^{-7} C both + or both – 15) 1/4 x 16) 4x 17) 2x
18) 6x 19) 4/9 x