Name:

Physics 12
M. Lam

Coulomb's Law

Block:

1. What will happen to the magnitude of the force between two charges q_1 and q_2 separated by a distance R if:
   a) one of the charges is doubled?
   b) both charges are doubled?
   c) separation distance is tripled?
   d) separation distance is halved?
   e) both charges are doubled and separation distance is doubled?
   f) both charges are doubled and separation distance is halved?

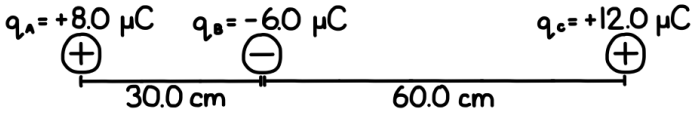
2. What force would be exerted on a +1.00 μC charge by a -1.00 μC charge that is 1.00 m away from it?

3. What is the force of repulsion between two bodies carrying +6.0 μC of charge and separated by 1.0 μm?

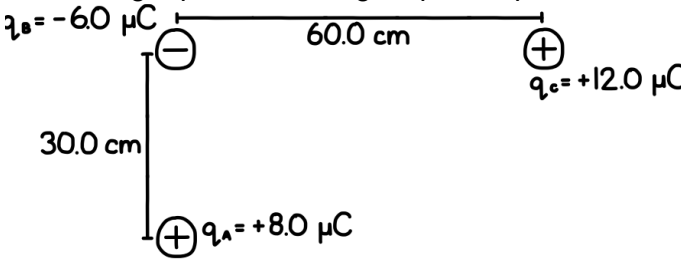
4. Two small spheres are located 0.50 m apart. Both have the same charge on them. If the repulsive force is 5.0 N, what charge is on the spheres?

5. One electron has a mass of 9.11×10^{-31} kg.
   a) How many coulombs of charge would there be in 1.0 kg of electrons?
   b) How much electrical force would this collection of charge exert on another 1.0 kg of electrons 1.0 m away?
   c) What would be the gravitational force of attraction between the two charge collections?

6. Determine the force on charge q_B due to charges q_A and q_C.



7. Determine the force on charge q_B due to charges q_A and q_C.



8. An electron is in a vacuum near the surface of the Earth. Where should you place a second electron so that the net force on the first electron (due to the other electron and gravity) is zero?

9. An electron orbits a nucleus which carries a charge of $+9.6 \times 10^{-19}$ C. The electron's orbital radius is 2.0×10^{-10} m.
    a) What is the speed of the electron?
    b) What is the orbital period of the electron?

10. An electron orbits the nucleus of an atom with velocity *v*. If this electron were to orbit the same nucleus with twice the previous orbital radius, what would its orbital velocity be in terms of *v*?