Assignment-2 (Regular Assignment)

Course: PHY 105/2105 Summer: 2024

Title: Physics 105/2105

Content: Coulomb's Law

1. Two small charged spheres repel each other with a force $=5\times10^{-4}$ N. The charge on one sphere is twice that on the other. When one of the charges is moved 10 cm away from the other, the force = 6×10^{-5} N. Calculate the charges and the initial distance between them.
2. Four charges +5q, +5q, +3q and –6q are placed at the corners of a square. (i) Draw the arrangement of the charges (ii) Calculate the magnitude and direction of electrostatic forces on a charge +1q at the intersection of the diagonals of the square of side 10 cm if $q = 5\times10^{-9}$C.
3. Four charges are arranged in a square with sides of length 2.5 cm. The two charges in the top right and bottom left corners are +5 C. The charges in the other two corners are -6 C. What is the net force and direction exerted on the charge in the top right corner by the other three charges?
4. What is (i) the force between two 4 gm pennies 2 m apart if we remove all the electrons from the $^{23}_{11}Na$ atoms? (ii) What is their acceleration as they separate?
5. Three charges lie on the x axis: q_1=+10 nC at the origin, q_2= -8 nC at x =2m, q_3=+20 nC at x=3 m. What is the net force on q_1? and What is the direction?