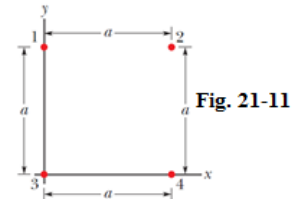


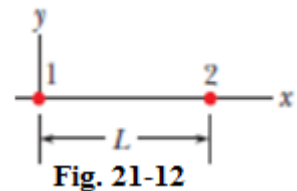
Suggested problems: Chapter 21- HRW-Principles of Physics- ISV 10th Edition.

3. In Fig. 21-11, the particles have charges $q_1 = -q_2 = 300 \text{ nC}$ and $q_3 = -q_4 = 200 \text{ nC}$, and distance $a = 5.0 \text{ cm}$. What are the (a) x and (b) y components of the net electrostatic force on particle 3?



Answer:(a) 0.22 N ; (b)−0.14 N

5. In Fig. 21-12, particle 1 of charge $+6.0 \mu\text{C}$ and particle 2 of charge $-2.0 \mu\text{C}$ are held at separation $L=10.0 \text{ cm}$ on an x axis. If particle 3 of unknown charge q_3 is to be located such that the net electrostatic force on it from particles 1 and 2 is zero, what must be the (a) x and (b) y coordinates of particle 3?



Answer: (a) +24cm ; (b) 0

11. The magnitude of the electrostatic force between point charges $q_1 = 26.0 \mu\text{C}$ and $q_2 = 47.0 \mu\text{C}$ is initially 5.70 N. The separation is then changed such that the force magnitude is then 0.570 N. (a) What is ratio of new separation to the initial separation? (b) What is new separation?

Answer:(a) 3.16 ; (b) 4.39 m

18. Two tiny, spherical water drops, with identical charges of $-1.00 \times 10^{-16} \text{ C}$, have a center-to-center separation of 1.20 cm. (a) What is the magnitude of the electrostatic force acting between them? (b) How many excess electrons are on each drop, giving it its charge imbalance?

Answer:(a) $6.24 \times 10^{-19} \text{ N}$; (b) 625 electrons

21. Two identical conducting spheres fixed in space, attract each other with an electrostatic force of 0.108 N when their center-to-center separation is 50.0 cm. The spheres are then connected by a thin conducting wire. When the wire is removed, the spheres repel each other with an electrostatic force of 0.144 N. Of the initial charges on the spheres, with a positive net charge, what was (a) the negative charge on one of them and (b) the positive charge on the other?

Answer:(a)−0.646 μC ; (b) +4.65 μC

29. Calculate the number of coulombs of positive charges in 500 cm³ of (neutral) water. (Hint: A hydrogen atom contains one proton ; oxygen atom contains eight protons)

Answer:2.7 $\times 10^7 \text{ C}$