



Name:

Date:

**Work each of the following problems. SHOW ALL WORK.**

4. One point charge has a magnitude of  $5.4 \times 10^{-7} \text{ C}$ . A second charge that is 0.25 m away has a magnitude of  $1.1 \times 10^{-17} \text{ C}$ . What is the electric force magnitude of one charge on the other?
5. A piece of styrofoam has a charge of 0.002 mC and is placed 0.5 m from a grain of salt with a charge of 0.03 nC. How much electrostatic force is produced?
6. A charged object has 82 protons, 82 neutrons, and 109 electrons. What is its overall charge? (Be sure to include the sign.)

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questions continued on next page

Unit 5C\_Practice Problems STUDENT

**Work each of the following problems. SHOW ALL WORK.**

7. In order to collect weather data on a remote island, you decide to send a weather balloon to the location. You attach a 1 C charged object to the balloon and plan to propel it to the island using electrostatic force. Given the balloon's size and the standard wind patterns en route, you will need to overcome an opposing air resistance of up to 100 N at any point on the balloon's journey. How much charge will you need to propel the 1 C balloon from your location to the island 750 km away, considering the opposing wind? Ignore the curvature of the earth.
8. A metal sphere has a charge of  $+2.3 \times 10^{-6} \text{ C}$  and lies 2 meters away from another metal sphere of unknown charge. If the attractive force present between the spheres is 0.05 N, what is the charge on the second sphere?
9. Four electrons are each located on the corners of a square, with the sides of the square measuring 1 m long. What is the total force (magnitude and direction) exerted on one of the electrons by the other three?

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