

9. \* Two identical small metal spheres are separated by  $1.0 \times 10^2$  m and exert an 18.9-N repulsive force on each other. A wire is connected between the spheres and then removed. The spheres now repel each other, exerting a 22.5-N force. (a) Explain why the force that these two objects exert on each other changed. (b) Determine everything you can about the situation before the wire was connected and after it was removed.

16. \* Two objects with charges  $q$  and  $4q$  are separated by 1.0 m. (a) Determine the sign, magnitude, and position of a third charged object that causes all three objects to remain in equilibrium. (b) Is the equilibrium stable or unstable? How do you know?

20. \* A triangle with equal sides of length  $1.0 \times 10^3$  m has  $-2.0$ -C charged objects at each corner. Determine the electrical force (magnitude and direction) exerted on the object at the top corner due to the two objects at the base of the triangle.

42. \* A small metal ball with positive charge  $+q$  and mass  $m$  is attached to a very light string, as shown in **Figure P14.42**. A larger metal ball with negative charge  $-Q$  is securely held on a plastic rod to the ceiling. Write an expression for the magnitude of the force  $T$  that the string exerts on the ball. Define any other quantities used in your expression.

