**Chapter-23**

1. A uniformly charged ring of radius 10.0 cm has a total charge of 75.0 *µ*C. Find the electric field on the axis of the ring at (a) 1.00 cm, (b) 5.00 cm, (c) 30.0 cm, and (d) 100 cm from the center of the ring.

1. A charge of 170 *µ*C is at the center of a cube of edge 80.0 cm. No other charges are nearby. (a) Find the flux through each face of the cube. (b) Find the flux through the whole surface of the cube. (c) **What If?** Would your answers to either part (a) or part (b) change if the charge were not at the center? Explain.

3. A particle with charge *q* is located a distance *d* from an infinite plane. Determine the electric flux through the plane due to the charged particle. (b) **What If?** A particle with charge *q* is located a *very small* distance from the center of a *very large* square on the line perpendicular to the square and going through its center. Determine the approximate electric flux through the square due to the charged particle. (c) How do the answers to parts (a) and (b) compare? Explain.

4. A uniformly charged, straight filament 7.00 m in length has a total positive charge of 2.00 *m*C. An uncharged cardboard cylinder 2.00 cm in length and 10.0 cm in radius surrounds the filament at its center, with the filament as the axis of the cylinder. Using reasonable approximations, find (a) the electric field at the surface of the cylinder and (b) the total electric flux through the cylinder.