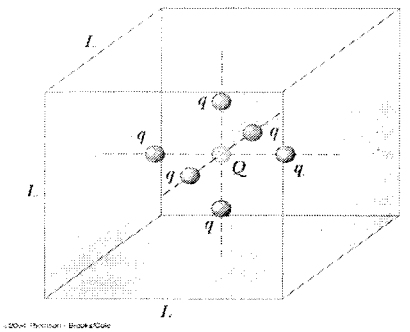
Name_____ SP222 Quiz

A point charge $Q = 5.00\ \mu C$ is located at the center of a cube of edge $L = 0.100$ m. In addition, six other identical point charges having $q = -1.00\ \mu C$ are positioned symmetrically around Q as shown in Figure P24.17. Determine the electric flux through one face of the cube.



$k = 8.99 \times 10^9$ N-m^2/C^2

$\varepsilon_o = 8.85 \times 10^{-12}$ C^2/ N-m^2

$$\Phi_E = \oint \vec{E} \bullet d\vec{A} = 4\pi k q_{enclosed} = \frac{q_{enclosed}}{\varepsilon_o}$$

$$(\Phi_E)_{\text{one face}} = \frac{Q - 6|q|}{6\,\epsilon_0} = \frac{(5.00 - 6.00)\times 10^{-6}\ \text{C}\cdot\text{N}\cdot\text{m}^2}{6\times 8.85\times 10^{-12}\ \text{C}^2} = \boxed{-18.8\ \text{kN}\cdot\text{m}^2/\text{C}}$$

Extra Credit: The Buffalo Bills lost four straight super bowls causing people to joke that "Bills" stands for Boy I Love Losing Superbowls. In what years did the losses occur? (1 point) Also note here if I owe you a point from boardwork.