PROB. OF CHAP. 17: Electric Energy and Potential

17.1. A large number of energetic cosmic-ray particles reach Earth's atmosphere continuously and knock electrons out of the molecules in the air. Once an electron is released, it responds to an electrostatic force that is due to an electric field $\vec{E}$ produced in the atmosphere by other point charges. Near the surface of Earth, this electric field has a magnitude of $|\overrightarrow{E}|$ = 150 N/C and is directed downward, as shown in Fig. 17.30. Calculate the change in electric potential energy of a released electron when it moves vertically upward through a distance d = 650 m.

17. 4. We study the three point charges shown in Fig. 17.32. They are held at the corners of an equilateral triangle

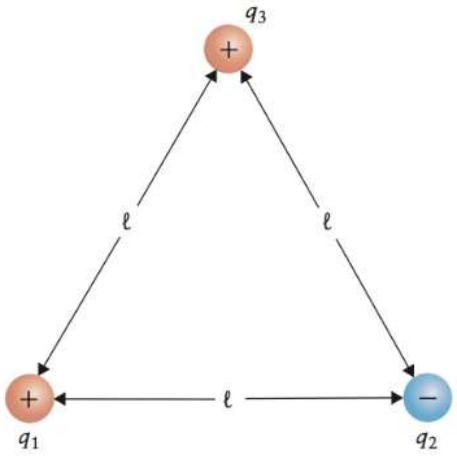

Figure 17.32

17.5. An ion is accelerated through a potential difference of 60 V, causing a decrease in its electric potential energy of 1.92×10^{-17} J. Calculate the charge the ion carries.

17.9. To recharge a 9 V battery, a charging device must move 2.7×10^5 C of charge from the negative terminal to the positive terminal. How much work is done by this device?

17.15. An air-filled parallel plate capacitor has a plate area of 5.0 cm^2 and plate separation of 1.0 mm. It stores a charge of 0.4 nC. (a) What is the potential difference across its plates? (b) What is the magnitude of the electric field between its plates?