

**32.31. Model:** A magnetic field exerts a magnetic force on a moving charge.

**Visualize:** Please refer to Figure Ex32.31.

**Solve:** (a) The force is

$$\vec{F}_{\text{on } q} = q\vec{v} \times \vec{B} = (-1.60 \times 10^{-19} \text{ C})(-1.0 \times 10^7 \hat{j} \text{ m/s}) \times (0.50 \hat{i} \text{ T}) = -8.0 \times 10^{-13} \hat{k} \text{ N}$$

(b) The force is

$$\vec{F}_{\text{on } q} = (-1.60 \times 10^{-19} \text{ C})(1.0 \times 10^7 \text{ m/s})(-\cos 45^\circ \hat{j} + \sin 45^\circ \hat{k}) \times (0.50 \hat{i} \text{ T}) = 5.66 \times 10^{-13} (-\hat{j} - \hat{k}) \text{ N}$$