22. Let $v_\parallel = v\cos\theta$. The electron will proceed with a uniform speed $v_\parallel$ in the direction of $\vec{B}$ while undergoing uniform circular motion with frequency f in the direction perpendicular to B: $f = eB/2\pi m_e$. The distance d is then

$$\begin{aligned} d &= v_\parallel T = \frac{v_\parallel}{f} = \frac{(v\cos\theta)2\pi m_e}{eB} \\ &= \frac{2\pi(1.5\times 10^7\,\mathrm{m/s})(9.11\times 10^{-31}\,\mathrm{kg})(\cos 10^\circ)}{(1.60\times 10^{-19}\,\mathrm{C})(1.0\times 10^{-3}\,\mathrm{T})} = 0.53\,\mathrm{m}\ . \end{aligned}$$