

30. (a) Using Eq. 29-23 and Eq. 29-18, we find

$$f_{\text{osc}} = \frac{qB}{2\pi m_p} = \frac{(1.60 \times 10^{-19} \text{ C})(1.2 \text{ T})}{2\pi(1.67 \times 10^{-27} \text{ kg})} = 1.8 \times 10^7 \text{ Hz} .$$

(b) From $r = m_p v / qB = \sqrt{2m_p K} / qB$ we have

$$K = \frac{(rqB)^2}{2m_p} = \frac{[(0.50 \text{ m})(1.60 \times 10^{-19} \text{ C})(1.2 \text{ T})]^2}{2(1.67 \times 10^{-27} \text{ kg})(1.60 \times 10^{-19} \text{ J/eV})} = 1.7 \times 10^7 \text{ eV} .$$