

14. Reviewing Sample Problem 32-1 before doing this exercise is helpful. Let

$$K = \frac{3}{2}kT = \left| \vec{\mu} \cdot \vec{B} - (-\vec{\mu} \cdot \vec{B}) \right| = 2\mu B$$

which leads to

$$T = \frac{4\mu B}{3k} = \frac{4(1.0 \times 10^{-23} \text{ J/T})(0.50 \text{ T})}{3(1.38 \times 10^{-23} \text{ J/K})} = 0.48 \text{ K} .$$