21. (a) Using the result of problem 3 in Chapter 39,

$$\Delta E = hc\left(\frac{1}{\lambda_1} - \frac{1}{\lambda_2}\right) = (1240\,\text{eV}\cdot\text{nm})\left(\frac{1}{588.995\,\text{nm}} - \frac{1}{589.592\,\text{nm}}\right) = 2.13\ \text{meV}\ .$$

(b) From $\Delta E = 2\mu_B B$ (see Fig. 41-10 and Eq. 41-18), we get

$$B = \frac{\Delta E}{2\mu_B} = \frac{2.13 \times 10^{-3}\,\text{eV}}{2(5.788 \times 10^{-5}\,\text{eV/T})} = 18\ \text{T}\ .$$