

50. (a) From Eq. 22-3,

$$E = \frac{e}{4\pi\epsilon_0 r^2} = \frac{(1.60 \times 10^{-19} \text{ C})(8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2)}{(5.2 \times 10^{-11} \text{ m})^2} = 5.3 \times 10^{11} \text{ N/C} .$$

(b) We use Eq. 30-28:

$$B = \frac{\mu_0 \mu_p}{2\pi r^3} = \frac{(4\pi \times 10^{-7} \text{ T}\cdot\text{m/A}) (1.4 \times 10^{-26} \text{ J/T})}{2\pi(5.2 \times 10^{-11} \text{ m})^3} = 2.0 \times 10^{-2} \text{ T} .$$

(c) From Eq. 32-10,

$$\frac{\mu_{\text{orb}}}{\mu_p} = \frac{eh/4\pi m_e}{\mu_p} = \frac{\mu_B}{\mu_p} = \frac{9.27 \times 10^{-24} \text{ J/T}}{1.4 \times 10^{-26} \text{ J/T}} = 6.6 \times 10^2 .$$