

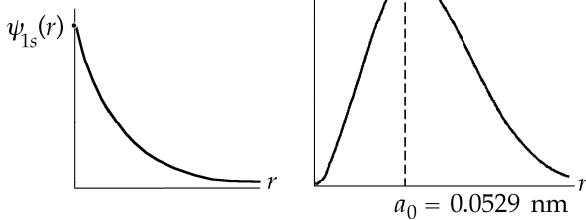
Chapter 42 Even Answers

2. (a) $2Zk_e e^2 / E$ (b) $E^2 / 2Zk_e e^2$ away from the target nucleus

4. (a) 1.89 eV, 656 nm (b) 3.40 eV, 365 nm

6. (a) See solution (b) 0.179 nm

8.



10. $4a_0$

12. 797 times

14. $1 = 4$

16. $L = \sqrt{6} h$; $L_z = -2h, -h, 0, h, 2h$; $\theta = 145^\circ, 114^\circ, 90.0^\circ, 65.9^\circ$, and 35.3°

20. (a) 2.52×10^{74} (b) $2.10 \times 10^{-41} \text{ J}$

22. 3h

24. (a) $1s^2 2s^2 2p^4$ (b) See solution

26. (a) See solution (b) 36

28. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 4f^{14} 5s^2 5p^6 5d^{10} 5f^{14} 6s^2 6p^6 6d^8 7s^2$

30. See solution

32. 124 V

36. Iron

38. L shell = 11.8 keV; M shell = 10.1 keV; N shell = 2.39 keV

40. 590 nm

42. $2.82 \times 10^{13} \text{ Hz}$, $10.6 \mu\text{m}$, infrared

44. $9.76 \times 10^{16} \text{ m}^{-3}$

- 46.** (a) -1.05×10^6 K (b) no real T below 0 K
- 48.** (a) 1.63×10^{-18} J (b) 7.88×10^4 K
- 50.** $1/a_0$, no
- 52.** 2.52 keV
- 54.** (a) ct (b) $E\lambda/hc$ (c) $\left(\frac{4}{ct\pi d^2}\right)\left(\frac{E\lambda}{hc}\right)$
- 56.** 0.389 T/m
- 58.**

The diagram shows energy levels for hydrogen. The ground state is at -4.10 eV. The first excited state is at -1.00 eV, and the second excited state is at -0.100 eV. Transitions are indicated by arrows: from the ground state to the first excited state at 1378 nm, and from the first excited state to the second excited state at 310 nm. The reference level is labeled $n = \infty$ at 0 eV.

- 60.** (a) antiparallel spins (parallel magnetic moments) (b) $5.89 \mu\text{eV}$
 (c) 1.04×10^{-30} eV
- 62.** 0.323
- 64.** (a) 1.30 e (b) 5.75 eV
- 70.** (a) $\sim -10^6 \text{ m/s}^2$ (b) $\sim 1 \text{ m}$