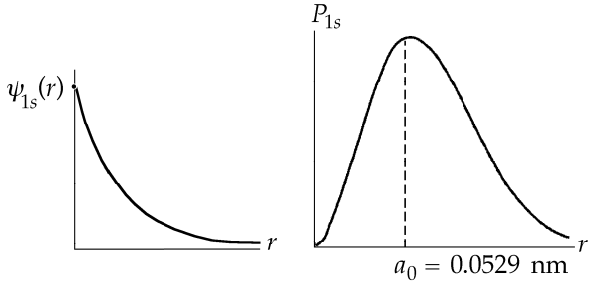
Chapter 42 Even Answers

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. $\ell = 4$

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

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

22. $3\hbar$

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. 2.82×10^{13} Hz, 10.6 μm, infrared

44. 9.76×10^{16} 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

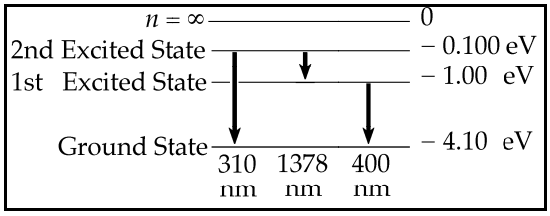
50. $1/a_0$, no

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.



60. (a) antiparallel spins (parallel magnetic moments) (b) 5.89 μeV

(c) 1.04×10^{-30} eV

62. 0.323

64. (a) $1.30e$ (b) 5.75 eV

70. (a) $\sim -10^{6}\ \mathrm{m/s^2}$ (b) ~1 m