Chapter 1 Even Answers

2. $623\ \text{kg/m}^3$

4. $\dfrac{4\pi\rho\,(r_2^3 - r_1^3)}{3}$

6. 7.69 cm

8. 8.72×10^{11} atoms/s

10. (a) 72.6 kg (b) 7.82×10^{26} atoms

12. equation is dimensionally consistent

16. The units of G are: $\text{m}^3/\text{kg} \cdot \text{s}^2$

18. 9.19 nm/s

20. (a) $3.39 \times 10^5\ \text{ft}^3$ (b) 2.54×10^4 lb

22. 8.32×10^{-4} m/s

24. 9.82 cm

26. (a) 6.31×10^4 AU (b) 1.33×10^{11} AU

28. (a) 1.609 km/h (b) 88.5 km/h (c) 16.1 km/h

30. (a) 3.16×10^7 s/yr (b) 6.05×10^{10} yr

32. $2.57 \times 10^6\ \text{m}^3$

34. 1.32×10^{21} kg

36. (a) 2.07 mm (b) 8.62×10^{13} times as large

38. (a) 13.4 (b) 49.1

40. $r_{\text{Al}} = r_{\text{Fe}} \sqrt[3]{(\rho_{\text{Fe}}/\rho_{\text{Al}})}$

42. $\sim 10^6$ km

44. $\sim 10^9$ drops

46. time required $\cong$ 50 years or more;
advise against accepting the offer

48. $\sim 10^5$ tons

50. (a) 2 (b) 4 (c) 3 (d) 2

52. (a) 797 (b) 1.1 (c) 17.66

54. (a) 3 (b) 4 (c) 3 (d) 2

56. $5.2\ \text{m}^3$, 2.7%

58. 1.79×10^{-9} m

60. 24.6°

62. (b) $A_{\text{cylinder}} = \pi R^2$, $A_{\text{rectangular solid}} = lw$

64. 0.141 nm

66. 289 μm

68. (a) 1000 kg (b) 5.2×10^{-16} kg 0.27 kg (d) 1.3×10^{-5} kg

70. Aluminum: $2.75\ \dfrac{\text{g}}{\text{cm}^3}$ (table value is 2% smaller)

Copper: $9.36\ \dfrac{\text{g}}{\text{cm}^3}$ (table value is 5% smaller)

Brass: $8.91\ \dfrac{\text{g}}{\text{cm}^3}$

Tin: $7.68\ \dfrac{\text{g}}{\text{cm}^3}$

Iron: $7.88\ \dfrac{\text{g}}{\text{cm}^3}$ (table value is 0.3% smaller)