Chemistry por Nivaldo Tro

Chapter 1

1.33. a. Theory - Explains what matter is.

b. Observation

c. Law - Summarizes observations and can explain future ones

d. Observation

35. a. ~~Mass Carbon / Mass Oxygen~~ Mass Oxygen / Mass Carbon

~~4 / 3~~ 4 / 3

b. Mass Oxygen / Mass Hydrogen

16 / 1

c. Law - Masses of elements in molecules are ratios of whole numbers

d. Hypothesis - Atoms combine in molecules in small whole number ratios

43. a. physical

b. Chemistry - Property observed by making or breaking chemical bonds

c. Physical

d. Physical

e. Physical

45. a. Chemical
b. Physical
c. Physical
d. chemical

47. a. Chemical
b. Physical
c. Chemical
d. Chemical

49. a. Physical
b. Chemical
c. Physical

103. a. Extensive
b. Intensive
c. Intensive
d. Intensive
e. Extensive

138. C

137. No. The volatile molecule would still be present in the jar.

142. a. Observation
b Theory
c. Observation
d. Law

36. No right answer here.

73. a. 73.5
b. 88.3
c. 649

74. a. 4.5
b. 37.4
c. 0.873

75. a. 1,050,501
b. ~~0.00~~20
c. ~~0.000000000000~~2
d. ~~0.00~~109~~0~~0

77. a. 3
b. 3 or 6
c. 3
d. 5
e. 1

79. a. Not exact; Number is longer
b. Exact
c. Not exact; measured.
d. Exact

81. a. 156.9
b. 156.8
c. 156.8
d. 156.9

83. a. 3 sig. fig. 1.84
b. 2 " " 0.033
c. 3 " " 0.500
d. 2 " " 34

85. a. 3 sig. fig. 41.4
b. 4 " " 133.5
c. 3 " " 73.0
d. 3 " " 0.42

87. a. 391.3
b. $1.1 \times 10^4$
c. 5.96
d. $5.93 \times 10^4$

~~101~~.

5 sig figs

101. $\frac{60\,\text{sec}}{\text{min}} \times \frac{60\,\text{min}}{1\,\text{hr}} \times \frac{24\,\text{hr}}{\text{mean solar day}} \times \frac{365.24\,\text{solar days}}{\text{solar year}} \times 1\,\text{solar year} = 3.1557 \times 10^{7}\,\text{sec}$

102. a. 50 million $= 5.0 \times 10^{7}$

b. 100 enemies / 10 jokes $= 1 \times 10^{1}$ enemies / joke

57. a. $4.5 \times 10^{-9}$ s

b. $18 \times 10^{-15}$ s $\rightarrow 1.8 \times 10^{-14}$ s

c. $1.28 \times 10^{-10}$ m

d. $35 \times 10^{-6}$ m $\rightarrow 3.5 \times 10^{-5}$ m

55. a. 1.2 nm
b. 22 fs
c. 1.5 Gg
d. 3.5 ML

59. b. $515\,\text{km} \times \frac{1 \times 10^{3}\,\text{m}}{1\,\text{km}} \times \frac{10\,\text{dm}}{\text{m}} = 5.15 \times 10^{6}\,\text{dm}$

c. $515\,\text{km} \times \frac{1 \times 10^{3}\,\text{m}}{\text{km}} \times \frac{100\,\text{cm}}{\text{m}} = 5.15 \times 10^{7}\,\text{cm}$

c. $122.355\,\cancel{s} \times \frac{1000\,ms}{\cancel{s}} = \cancel{1.22\times10^{5}\,ms}$

$1.22355\times10^{5}\,ms$

$122.355\,s \times \frac{1\times10^{-3}\,ks}{1} = 1.2235\times10^{-1}\,ks$

or $0.12235\,ks$

d. $3.345\,\cancel{kJ} \times \frac{1000\,J}{\cancel{kJ}} = 3.345\times10^{3}\,J$

$3.345\,\cancel{kJ} \times \frac{1000\,\cancel{J}}{\cancel{kJ}} \times \frac{1000\,mJ}{\cancel{J}} = 3.345\times10^{6}\,J$

61. 254,998 m

a. 254.998 km

b. 0.254998 Mm

c. 254,998,000 mm

d. 25,499,800 cm

63. Each square is $1\,cm^2$

Big square is $1\,m^2$

$\frac{(100\,cm)^2}{(1\,m)^2} = \frac{1\times10^{4}\,cm^2}{1\,m^2}$ $\therefore \frac{1\times10^{4}}{=}$

95. $195\ m^2$

a. $195\ m^2 \times \frac{(1000m)^2}{(1km)^2} \quad \frac{(1km)^2}{(1000m)^2} = \frac{1.95\times10^{2}\ km^2}{1\times10^{-6}} = 1.95\times10^{-4}$

b. $195\ m^2 \times \frac{(10dm)^2}{(1m)^2} = 195\ m^2 \times \frac{100\ dm^2}{m^2} = 1.95\times10^{4}\ dm^2$

c. $195\ m^2 \times \frac{(100cm)^2}{(1m)^2} = 195\ m^2 \times \frac{10000\ cm^2}{m^2} = 1.95\times10^{6}\ cm^2$

65. Density $(g/cm^3)$

Copper = $8.96\ g/cm^3$ According to Table 1.4

Penny $\frac{2.49\ g}{0.349\ cm^3} = 7.14\ \frac{g}{cm^3}$ Not ~~cop~~ pure copper because density is an intrinsic property

69. a. $28.56\ mL \times \frac{1\ cm^3}{1\ mL} \times \frac{1.11\ g}{cm^3} = 31.70\ g \quad 4.63\times10^{2}\ g$

b. $4.1\ kg \times \frac{1000\ g}{kg} \times \frac{1\ cm^3}{1.11\ g} \times \frac{1\ mL}{1\ cm^3} \times \frac{1\ L}{1000\ mL} = 3.7\ L$

141. a. Darker colored box has a heavier mass but smaller volume.
More dense

b. Lighter colored box has a heavier mass but same volume.
More dense.

c. Can not tell.

89. a. $154\ cm \times \frac{1\ in}{2.54\ cm} = 60.6\ in.$

b. $3.14\ kg \times \frac{1000\ g}{1\ kg} = 3.14 \times 10^5\ g$

c. $3.5\ L \times \frac{1.057\ qt}{L} = 3.7\ qt$

d. $109\ \cancel{mm} \times \frac{1\ \cancel{cm}}{10\ \cancel{mm}} \times \frac{1\ in}{2.54\ \cancel{cm}} = 4.29\ in$

99. $\frac{80\ mg}{0.80\ mL}$ suspension.

Recommended $\frac{15\ mg}{kg}$ body weight

Infant weight: 14 lb

$14\ \cancel{lb} \times \frac{1\ \cancel{kg}}{2.205\ \cancel{lb}} \times \frac{15\ \cancel{mg}}{\cancel{kg}} \times \frac{0.80\ mL}{80\ \cancel{mg}} = 0.95\ mL$

51. a. $°C = \frac{(°F - 32)}{1.8}$ ; 32°F

$°C = \frac{32-32}{1.8} = 0.°C$

d. $K = °C + 273.15$

$K = \left[\frac{(°F - 32)}{1.8}\right] + 273.15$ ; 98.6 °F

$K = \left[\frac{(98.6\,°F - 32)}{1.8} + 273.15\right]$

$K = 310.2$

54. 134°F

a. $°C = \frac{(F-32)}{1.8} = 56.7$

b. $K = \left[\frac{(°F-32)}{1.8} + 273.15\right] = 329.8$