CHAPTER 1: ANSWERS TO ASSIGNED PROBLEMS
Hauser- General Chemistry I
revised 8/03/08

1.19 Label each of the following as either a physical process or a chemical process:
(a) corrosion of aluminum metal: chemical
(b) melting of ice: physical
(c) pulverizing an aspirin: physical (sort of!)
(d) digesting a candy bar: chemical
(e) explosion of nitroglycerin: chemical

1.25 Make the following conversions:
(a) 62 °F to °C: \[
\left(\frac{62 \, ^\circ F + 40}{9} \right) \times \frac{5}{9} \times 17 = 16.666 \times ^\circ C
\]
or \[
\frac{5}{9} \times (62 \, ^\circ F - 32) = 17 \, ^\circ C
\]
(b) 216.7 °C to °F: \[
\left(\frac{216.7 \, ^\circ C + 40}{5} \times \frac{9}{9} \right) \times 17 = 422.06 = 422.1 \, ^\circ F
\]
(c) 233 °C to K: \[
233 \, ^\circ C + 273.15 = 506.15 = 506 \, K
\]

1.35 What is the number of significant figures in each of the following measured quantities?
(a) 358 kg: 3
(b) 0.054 s: 2
(c) 6.3050 cm: 5
(d) 0.0105 L: 3
(e) 7.0500 X 10^-3 m: 5

1.37 Round each of the following numbers to four significant figures, and express the result in standard exponential notation:
(a) 102.53070 = 102.5 = 1.025 \times 10^2
(b) 656980 = 657000 = 6.570 \times 10^5
(c) 0.008543210 = 0.008543 = 8.543 \times 10^{-3}

1.39 Carry out the following operations, and express the answers with the appropriate number of significant figures
(a) 12.0550 + 9.05 = 21.105 = 21.11 (1 dp)
(b) 257.2 - 19.789 = 237.411 = 237.4 (1 dp)
(c) (6.21 \times 10^3) (0.1050) = 652.05 = 652 (3 SF)
(d) 0.0577 / 0.753 = 0.076626 = 0.0766 (3 SF)

1.27 (c) The density of magnesium is 1.738 g/cm³ at 20 °C. What is the volume of 87.50 g of this metal at this temperature?

\[
D = \frac{m}{v} \quad \text{so} \quad v = \frac{m}{D} = 87.50 \, \text{g} / 1.738 \, \text{g/cm}^3 = 50.34522 = 50.35 \, \text{cm}^3
\]
(g units cancel, cm³ ends up on top)
1.8 (a) How many significant figures should be reported for the volume of the metal bar shown below?

2 SIG FIGS due to least value of 2.5 cm

(b) If the mass of the bar is 104.7 g, how many significant figures should be reported when its density is calculated using the calculated volume

2 SIG FIGS – that 2.5 cm value will continue to be the least # of Sig Figs.

ADDITIONAL EXERCISE #1

Calculate the result for the following "mixed operation":

\[ 19.667 - (5.4 \times 0.916) = 19.667 - (2 \text{ SF} \times 3 \text{ SF}) \text{ gives } 4.9464 \text{ with } 2 \text{ SF} \]

The 2 SF 4.9464 value also has only 1 dec place. When we subtract this unrounded # from 19.667, we can only get 1 dp. [19.667 – 4.9464] = 14.7206 = 14.7 (1 dp)

1.43 Perform the following conversions:
(a) 0.076 L to mL \quad 0.076 \text{ L} \left( \frac{1000 \text{ mL}}{1 \text{ L}} \right) = 76 \text{ mL} (2 \text{ SF})
(b) 5.0 \times 10^{-8} \text{ m to nm} \quad 5.0 \times 10^{-8} \text{ m} \left( \frac{1 \text{ 000 000 000 nm}}{1 \text{ m}} \right) = 50 \text{ nm} (2 \text{ SF})
(c) 6.88 \times 10^{5} \text{ ns to s} \quad 6.88 \times 10^{5} \text{ ns} \left( \frac{1 \text{ s}}{1 \text{ 000 000 000 ns}} \right) = 6.88 \times 10^{-4} \text{ s} (3 \text{ SF})
(d) 0.50 \text{ lb to g} \quad 0.50 \text{ lb} \left( \frac{453.59 \text{ g}}{1 \text{ lb}} \right) = 226.795 = 230 \text{ g} (2 \text{ SF}) \text{ maintain size}
(f) 5.850 \text{ gal / hr to L / s} \quad 5.850 \text{ gal / hr} \left( \frac{3.7854 \text{ L}}{1 \text{ gal}} \right) \left( \frac{1 \text{ hr}}{60 \text{ min}} \right) \left( \frac{1 \text{ min}}{60 \text{ s}} \right) = 0.006151 \text{ L / s} (4 \text{ SF})

1.45 Perform the following conversion:
(f) 0.02500 \text{ ft}^3 \text{ to cm}^3 \quad 0.02500 \text{ ft}^3 \left[ \frac{(12)^3 \text{ in}^3}{1 \text{ ft}^3} \right] \left[ \frac{(2.54)^3 \text{ cm}^3}{1 \text{ in}^3} \right] = 707.9211 = 707.9 \text{ cm}^3 (4 \text{ SF})

DID YOU CUBE THE CONVERSIONS?