CHE 107 Homework: Chapter 1

This assignment should be submitted online at Blackboard. You can type in the answers in the Word document provided at Blackboard and submit the file. Alternatively, you can write the answers by hand and then submit a scan or cell-phone photos of the pages. The instructor will provide comments and corrections on the submitted document(s). **This assignment is due by Tuesday September 19th.**

Section numbers below are those in the textbook Chemistry. A Molecular Approach, 5th Ed., by NV Tro.

1. Write the following measurements in scientific notation:

   a. 76 000 000 m   **b.** 0.000 05 m

   c. 0.0013 s   **d.** 2300 g

2. Underline (or otherwise indicate) the number in each pair that is <u>smaller</u>.

   a. 5.8×10^{-3} or 3.5×10^{-9} **b.** 3.4×10^{2} or 1150

   c. 2×10^{4} or 2×10^{-4} **d.** 0.000 31 or 6.5×10^{-4}

3. (Section 1.3) Indicate whether each of the following describes a gas (g), a liquid (l), or a solid (s):

   a. The substance has a definite volume but takes the shape of the container.

   b. The particles are very close together and have fixed positions.

   c. This substance occupies the entire volume of the container.

   d. The particles of this substance move very rapidly and do not interact.

   e. The particles interact strongly and move to a moderate extent.

4. (Section 1.3) Classify each of the following as a pure substance (P) or a mixture (M):

   a. gold   **b.** air   **c.** sodium chloride

   d. seawater   **e.** nitrogen   **f.** chicken noodle soup

5. (Section 1.3) Classify each of the following mixtures as homogeneous (hom) vs. heterogeneous (het):

   a. brass   **b.** apple juice (clear)

   c. oil and water   **d.** water and sand

6. (Section 1.4) Classify each of the following changes as chemical (c) or physical (p):

   a. burning paper

   b. fogging the mirror during a shower

   c. breaking a bone

   d. formation of snowflakes

   e. tarnishing of a silver bracelet

7. (Section 1.5) Identify the energy in each of the following as potential (P) or kinetic (K):

   a. dancing   **b.** a boulder resting on top of a mountain

   c. the energy in your food   **d.** kicking a ball

   e. stretched rubber   **f.** a car speeding down the highway

8. (Section 1.6) List the following prefixes in <u>increasing</u> order of size: kilo, micro, deci, nano, mega, centi, milli, giga. Write the abbreviation for each prefix.

9. (Section 1.6) Complete the following metric relationships:

   a. 1 mL = _____ L   **b.** 1 m = _____ cm   **c.** 1 mg = _____ μg

   d. 1 s = _____ ms   **e.** 1 kg = _____ g   **f.** 1 μL = _____ mL

10. (Section 1.6) Indicate which of the following measurements are equivalent (write "Eq").

   a. 25 cm = 0.25 m   **b.** 22 dL = 0.22 L   **c.** 53 mg = 0.053 g

   d. 4.5 kg = 4500 g   **e.** 830 mm = 8.3 cm   **f.** 0.064 mL = 64 μL (64 mcL)

11. (Section 1.6) Solve the following temperature conversions:

a. 22 °C = _____°F   b. 185 °C = _____°F   c. –22 °F = _____°C

d. 104.3 °F = _____°C   e. 310 K = _____°C   f. 125 °F = _____K

12. (Section 1.6) What is the density (g/mL) of each of the following samples?

a. A medication, if 4.00 mL has a mass of 4.80 g.

b. A piece of metal with a mass of 253 g is added to 50.0 mL of water. The volume increases to 72.4 mL. What is the density of the metal? **Show your work.**

13. (Section 1.7) How many significant figures are in each of the following measured quantities?

a. 35.8 °C   b. 1136.48 g   c. 7.00 m

d. 0.060 L   e. 60 800 000 g   f. 5.0 x 10^{-3} L

14. (Section 1.7) Round off each of the following calculator answers to three significant figures:

a. 2.524   b. 124.3056   c. 0.005 726 625

d. 9927   e. 3.6852 x 10^8

15. (Section 1.7) Indicate whether the following numbers are measured (M) or exact (E).

    a. 16 ounces in 1 lb   **b.** 454 g in 1 lb   **c.** 1.06 qt = 1 L

    d. 42 students   **e.** 25 miles/gal   **f.** 10 mm in 1 cm

16. (Section 1.7) For the following problems, give answers with the <u>correct number of significant figures</u> (note that the rule for multiplication/division differs from that for addition/subtraction):

    a. 3.1 x 21.5 =   **b.** $\dfrac{(2.40)\,(43)}{(5.5)}$ =

    c. 4.5 + 3.26 + 1.811 + 7 =

17. (Section 1.8) Solve the following problems using one or more conversion factor <u>**(show your work and round your answers to the correct number of significant figures)**</u>:

    a. How many pounds are in 7.0 kg?

    b. What is 15.4 cm converted to inches?

    c. How many qt are in 4.6 L of liquid?

    d. A patient needs 0.024 g of a sulfa drug. There are 8-mg tablets in stock. How many tablets should be given?

e. A physician has ordered 1.0 g of tetracycline to be given every 6 hours to a patient. If your stock on hand is 250-mg tablets, how many will you need for 1 day's treatment?

18. (Section 1.8) Solve the following problems involving density. **Show your work.**

a. What is the mass of 1.5 L of a glucose solution that has a density of 1.15 g/mL? (Note that the volume of the solution is given in liters, whereas the density unit has milliliters.)

b. An aluminum bar (density = 2.7 g/mL) has a mass of 12.2 g. What is its volume?