Chemistry—Ch.1 & Ch. 2 Review

**%Error, Significant Figures, & Scientific Notation** Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. How many significant figures are in the following measurements?

a. 0.00250 m \_\_\_\_\_ b. 1.0023 cm \_\_\_\_\_\_ c. 1401.0 ml \_\_\_\_\_\_

d. 13,000 g \_\_\_\_\_\_ e. 1.20 x 103 km \_\_\_\_\_\_ f. 8.5 x10 –3 g \_\_\_\_\_\_

2. Round off the given numbers to the number of significant figures indicated.

a. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 200.83 m to 3 sig. figures

b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 200.83 m to 2 sig. figures

c. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 0.995 kg to 2 sig. figures

d. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 636.50000001 sec to 3 sig. figures

e. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 28.49 mice to 2 sig. figures

f. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 7138 squirrels to 1 sig. digit

3. Answer the following using the appropriate rules of significant figures.

a. 54.78 m b. 0.08235 sec c. 3.00015 L

+ 14.8931 m + 1.3 sec - 0.543 L

+ 0.971 m - 0.670 sec + 0.00000000003 L

d. 6.4329 g + 12 g - 8.6500 g =

e. 54.78 m f. 0.08235 sec g. 3.00015 L

÷ 14.8931 m x 1.3 sec ÷ 0.543 L

x 0.971 m x 0.670 sec x 0.00000000003 L

h. 6.4329 g x 12 g ÷ 8.6500 g =

4. Write the following numbers in scientific notation:

a. 1234000 \_\_\_\_\_\_\_\_\_\_\_\_\_ b. 0.00103 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c. 14, 900.0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ d. one thousand two hundred \_\_\_\_ \_\_\_\_\_\_\_\_\_

5. Write the following numbers in decimal notation:

a. 3.76 x 105 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ b. 4.845 x10 –5 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c. 8.04 x 106 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ d. 1.036 x10 –3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***(SHOW ALL WORK!)***

**Question 1**

How many significant figures are in the following values?  
a. 4.02 x 10-9  
b. 0.008320  
c. 6 x 105  
d. 100.0

**Question 2**

How many significant figures are in the following values?  
a. 1200.0  
b. 8.00  
c. 22.76 x 10-3  
d. 731.2204

**Question 3**

Which value has more significant figures?  
2.63 x 10-6 or 0.0000026

**Question 4**

Express 4,610,000 in scientific notation.  
a. with 1 significant figure  
b. with 2 significant figures  
c. with 3 significant figures  
d. with 5 significant figures

**Question 5**

Express 0.0003711 in scientific notation.  
a. with 1 significant figure  
b. with 2 significant figures  
c. with 3 significant figures  
d. with 4 significant figures  
  
  
  
**Question 6**

Perform the calculation with the correct number of significant digits.  
3.2215 + 1.67 + 2.3

**Percent Error**

1. The theoretical yield in a particular chemical reaction is 0.1062 g. The actual yield obtained by a chemist in an experiment is 0.0098 g. Calculate the percent error for this experiment.
2. A student decides it is possible to estimate the capacity of a test tube by treating it as a rectangle and neglecting it’s “roundness”. On this basis, the student finds the capacity of the test tube to be 100.5 ml. In fact, the real capacity of the test tube is 100.0 ml. What percent error has resulted from the student’s assumption?
3. A chemist attempts to determine the surface tension of various detergent-containing liquids by using a tensiometer. In determining the accuracy of the instrument, the chemist tests the surface tension of pure water and obtains a value of 71.28 dynes cm. The standard value for surface tension of pure water is 71.97 dynes cm. What is the percent error of the tensiometer?
4. In an exercise to teach students how to use and analytical balance, the instructor gives a student a quarter which has been pre-weighed as 5.6026 g. The weight that the student obtains for the same quarter is 5.6013 g. What is the percent error in the students reading?
5. The concentration determined for an unknown sample of hydrochloric acid by a student is 0.1355 M. According to the instructor’s information, the true molarity (M) of this solution is 0.1364 M. What is the percent error in this experiment?

**Conversions**

* There are 5280 feet in one mile
* There are 0.034 ounces in one milliliter
* There are 0.454 kg in one pound
* There are 1.6 kilometers in one mile
* There are 73 gallons in 2 barrels
* There are 1.05 quarts in one liter
* There are 4 quarts in one gallon

*Do the following one-step unit conversions:*

1) Convert 23 miles to feet.

2) Convert 12 lbs to kilograms.

3) Convert 45 mL to ounces.

4) Convert 2,000 feet to miles.

5) Convert 6 quarts to liters.

6) Convert 4.5 barrels to gallons.

**Density**

1. State the formula for density in words and mathematical symbols.
2. A rock has a mass of 210 grams and occupies a volume of 70 cm3. What is its density?
3. An unknown liquid occupies a volume of 5 ml and has a mass of 40 grams. Find its density.
4. Define the following vocabulary words: Mass, Volume, Density