Worksheet 1: Math Skills (Show all work.)

Significant Figures

1. How many sig fig are in the following number?
   a. 0.0450 _____ b. 790 _____ c. 32.10 _____
2. Round each number to 2 sig fig.
   a. 15.97 _____ b. 8810 _____ c. 0.00386 _____
3. Solve the following problems Round your answer using sig fig.
   a. (825cm) (32cm) (0.248cm) = b. 15.68g – 2.885g =

Density

4. A cube of ruthenium metal is 1.5cm on a side has a mass of 42.0g. What is the density? Will ruthenium metal float on water?

Conversions *Use dimensional analysis.*

5. 16.2m to km

6. 45.7mL/s to kL/hr

Reactions*:*

7. *Balance the following reactions and tell what type of reaction it is.*

   a) $KNO_3 \longrightarrow KNO_2 + O_2$

   b) $AgNO_3 + K_2SO4 \longrightarrow Ag_2SO_4 + KNO_3$

   c) $CH_3NH_2 + O_2 \longrightarrow CO_2 + H_2O + N_2$

   d) $N_2O_5 + H_2O \longrightarrow HNO_3$
8. What are diatomic ions? Name them.

Average Atomic Mass

9. Magnesium consists of 3 naturally occurring isotopes with the masses 23.98504, 24.98584, 25.98259amu. The relative abundances of these three isotopes are 78.70%, 10.13%, and 11.17% respectively. Calculate the atomic mass.

Percent Composition

10. Calculate the percent composition of $C_{12}H_{22}O_{11}$ (sugar). Give the percent of each element.

Moles

11. Calculate the number of mole of the following.
    a. 42.8g of KNO_3

    b. 155.7L of CO_2

    c. 9.25×10^{26} formula units

Stoichiometry

12. How many grams of sodium sulfate will be formed if you start with 200 grams of sodium hydroxide and you have an excess of sulfuric acid?
    $2NaOH + H_2SO_4 \longrightarrow 2H_2O + Na_2SO_4$

13. How many atoms of iron are produced from 16.5g of Fe_2O_3?
    $Fe_2O_3 + H_2 \longrightarrow Fe + H_2O$

Limiting Reagent & percent yield

14. Determine the limiting reagent and percent yield of water produced when 68.3g of hydrogen reacts with 85.4g of oxygen and 86.4g water are collected.
    $2H_2 + O_2 \longrightarrow 2H_2O$