# CHEM-1105   SIGNIFICANT FIGURES AND DENSITY

1.  How many significant figures are there in each of the following:

    545m ___           4.05g _____           43200cm   _____
    333K ___           0.035 _____           4.80x10$^9$nm _____

2.  Round each of the following numbers to two sig figs.

    43.85   _____       534.4   _____       300   _____
    0.00234_____       6039   _____       0.3   ____

3.  Rewrite 321000 to show the indicated number of sig figs.

    3     _____ 4   _____       1   _____       2   _____

4.  Perform the following conversions:
    25 km into nm                                       _____
    2.3 mg into kg                                      _____
    365 yards into m                                    _____
    6.85 m$^3$ into L                                   _____
    225 pounds into kg                                  _____
    565 m$^2$ into ft$^2$                               _____

5.  You have a 100.0 mL graduated cylinder containing 50.0 mL of water. You drop a 35.69 g piece of pure nickel into the water. To what mark will the water rise in the cylinder? Density of nickel is 8.908g/cm$^3$.                _____

6.  A ball of titanium weighs 16.19 g and has a diameter of 19.0 mm. Calculate the density in g/cm$^3$.                _____

7.  Density of silver is 10.5 g/cm$^3$. Express this in
    Kg/m$^3$        _____        g/dm$^3$        _____

8.  An ancient gold coin is 0.866 inches in diameter and 3.00mm thick. If the density of gold is 1.93x10$^4$kg/m$^3$, what is the mass of the coin in grams?                _____

9.  Copper has a density of 8.94 g/cm$^3$. An ingot of copper with a mass of 57 kg is drawn into wire with a diameter of 9.50 mm. What length of wire, in meters, can be produced?        _____

10. Automobile batteries are filled with sulfuric acid, $H_2SO_4$. What is the mass of the acid, in grams, in 500. mL of the battery acid if the density of the solution is 1.285 g/cm$^3$ and the solution is 38.08% sulfuric acid by mass? _____

11. A certain hydrochloric acid, HCl, solution contains 26.0% HCl by mass and has a density of 1.130 g/cm$^3$. How many litres of the acid solution are required to have 1.50 kg of HCl? _____

12. One teaspoon of oil (approximately 5mL) could cover about 0.5 acre of still water (1.0x10$^4$ m$^2$ = 2.47 acres).What is the thickness of the layer of oil in cm and nm? _____

13. The aluminum in a package containing 75 ft$^2$ of kitchen foil weighs 12 ounces (1 ounce is 28.4 g). The density of aluminum is 2.70 g/cm$^3$. What is the approximate thickness of the foil in mm?

_____

14. If a frying pan needs Teflon coating that is 1.00 mm thick, and the area to be covered is 36.0 in$^2$, how many pounds of Teflon are needed to coat one million frying pans. Teflon has a density of 2.20 g/cm$^3$. _____

15. A pycnometer is a device used to determine the density of liquids. It has a mass of 20.455 g when empty and 31.486 g when filled with water (d = 1.00g/cm$^3$). Pieces of an alloy are put into the empty and dry pycnometer and the mass is found to be 28.695 g. Water is carefully added to fill the pycnometer and the mass of the pycnometer, alloy, and water is found to be 38.689 g. Calculate the density of the alloy. _____