CHEM 130 **Name** _____
Quiz 2 – September 2, 2016

Complete the following problems. Write your final answers in the blanks provided. You must show your work to receive full credit. Show your answers to the correct number of significant figures with the correct units.

Percent (%) = (parts component)/(100 parts mixture) e.g. % by mass = (g component)/(100g mixture)

1. Perform the following conversions. Report your answers in scientific notation. (6 pts.)
   a. 12,700 km (diameter of a earth) = _____**1.27×10^{16}** _____nm

$$12{,}700\ \cancel{km} \times \frac{10^3\ \cancel{m}}{1\ \cancel{km}} \times \frac{1\ nm}{10^{-9}\ \cancel{m}} = \mathbf{1.27\times10^{16}\ m}$$

   b 9.81 m/s^2 (acceleration due to gravity) = _____**3.53×10^{6}** _____cm/min^2

$$\frac{9.81\ \cancel{m}}{\cancel{s}^2} \times \frac{1\ cm}{10^{-2}\ \cancel{m}} \times \frac{(60\ \cancel{s})^2}{(1\ min)^2} = \mathbf{3.53\times10^{6}\ cm/min^2}$$

2. Perform these calculations. Report your results to the correct number of significant figures. (6 pts)
   a.
$$\frac{32.44 + 4.9 - 0.304}{82.94} = \frac{37.0}{82.94} = 0.447$$
   b.
$$\frac{(1.45\times10^{2})\times(8.76\times10^{-4})}{(9.2\times10^{-3})^{2}} = \frac{0.12702}{8.464\times10^{-5}} = 1.5\times10^{3}$$

3. In an engineering reference book, you find that the density of iron is 4.544 oz/in^3. What is the density in g/cm^3? (1.00 lb = 453.6 g, 1 lb is exactly 16 oz, 1 inch is exactly 2.54 cm.) (6 pts)

$$\frac{4.544\ \cancel{oz}}{\cancel{in}^3} \times \frac{1\ \cancel{lb}}{16\ \cancel{oz}} \times \frac{453.6\ g}{1.00\ \cancel{lb}} \times \frac{(1\ \cancel{in})^3}{(2.54\ cm)^3} = \mathbf{7.86\ g/cm^3}$$

Answer____**$7.86\ g/cm^3$**_____

4. A solution of sucrose in water is 28.0 % sucrose by mass and has a density of 1.118 g/mL. What mass of sucrose, in grams, is contained in 3.50 L of this solution? (7 pts)

$$3.50\ \cancel{L\ soln} \times \frac{10^3\ \cancel{mL\ soln}}{1\ \cancel{L\ soln}} \times \frac{1.118\ g\ soln}{1\ \cancel{mL\ soln}} \times \frac{28.0\ g\ sucrose}{100\ g\ soln} = \mathbf{1095.6\ g\ sucrose}$$

Answer__**1.10×10^{3} g sucrose** ___