Chem 120 **Name** ______________________________

Quiz 2 – Sept. 5, 2008

Complete the following problems. You must show your work for mathematical problems to receive full credit. Show your answers to the correct number of significant figures with the correct units.

1. Complete the following conversions. (8 pts.)
   a. 1.46×10^{-8} kg = ?? μg

$$1.46 \times 10^{-8}\ \text{kg} \times \frac{10^{3}\ \text{g}}{1\ \text{kg}} \times \frac{1\ \mu\text{g}}{10^{-6}\ \text{g}} = \mathbf{14.6\ \mu g}$$

   b. $1.28 \times 10^{4}\ \text{mm}^3$ = ?? cm^3

$$1.28 \times 10^{4}\ \text{mm}^3 \times \frac{(10^{-3}\ \text{m})^3}{(1\ \text{mm})^3} \times \frac{(1\ \text{cm})^3}{(10^{-2}\ \text{m})^3} = \mathbf{12.8\ cm^3}$$

2. A degreasing solution consisting of 8.50% acetone and 91.5% water by mass has a density of 0.9867 g/mL. An industrial cleaning application requires 2.54 kg of acetone, how many liters of solution must be used to deliver this mass of acetone? (9 pts.)

$$2.54\ \text{kg acetone} \times \frac{100\ \text{kg solution}}{8.50\ \text{kg acetone}} \times \frac{10^{3}\ \text{g solution}}{1\ \text{kg solution}} = 29882\ \text{g solution needed}$$

$$29882\ \text{g solution} \times \frac{1\ \text{mL solution}}{0.9867\ \text{g solution}} \times \frac{1\ \text{L}}{10^{3}\ \text{mL}} = 30.2_{8}\text{L} = \mathbf{30.3\ L\ solution\ needed}$$

3. We often calculate the standard deviation of a dataset as a means of examining the precision of a dataset with a goal of evaluating the "quality" of the results. What does the standard deviation tell us about our data? Why do we often use a confidence limit instead? (Be concise, a few of sentences is sufficient. You don't need to list equations) (8 pts.)

   The standard deviation is a measure of the scatter of our data around some average. Ideally, we collect a large number of data points to best determine the standard deviation. In practice, however, we often collect only a small data set. To compensate for this, we use the confidence limit which has a built in scaling factor to account for our small number of data points.

Possibly Useful Information

$e_4 = \sqrt{e_1^2 + e_2^2 + e_3^2}$	$\frac{e_4}{v_4} = \sqrt{\left(\frac{e_1}{v_1}\right)^2 + \left(\frac{e_2}{v_2}\right)^2 + \left(\frac{e_3}{v_3}\right)^2}$
$\mu = \bar{x} + \frac{ts}{\sqrt{n}}$	$\bar{x} = \frac{\sum x_i}{n}$
Too much of anything will kill you!	$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$
D = m/v	Don’t talk to strangers!

PERIODIC CHART OF THE ELEMENTS

IA	IIA	IIIB	IVB	VB	VIB	VIIB		VIII		IB	IIB	IIIA	IVA	VA	VIA	VIIA	INERT GASES
1 H 1.00797																1 H 1.00797	2 He 4.0026
3 Li 6.939	4 Be 9.0122											5 B 10.811	6 C 12.0112	7 N 14.0067	8 O 15.9994	9 F 18.9984	10 Ne 20.183
11 Na 22.9898	12 Mg 24.312											13 Al 26.9815	14 Si 28.086	15 P 30.9738	16 S 32.064	17 Cl 35.453	18 Ar 39.948
19 K 39.102	20 Ca 40.08	21 Sc 44.956	22 Ti 47.90	23 V 50.942	24 Cr 51.996	25 Mn 54.9380	26 Fe 55.847	27 Co 58.9332	28 Ni 58.71	29 Cu 63.54	30 Zn 65.37	31 Ga 69.72	32 Ge 72.59	33 As 74.9216	34 Se 78.96	35 Br 79.909	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.905	40 Zr 91.22	41 Nb 92.906	42 Mo 95.94	43 Tc (99)	44 Ru 101.07	45 Rh 102.905	46 Pd 106.4	47 Ag 107.870	48 Cd 112.40	49 In 114.82	50 Sn 118.69	51 Sb 121.75	52 Te 127.60	53 I 126.904	54 Xe 131.30
55 Cs 132.905	56 Ba 137.34	*57 La 138.91	72 Hf 178.49	73 Ta 180.948	74 W 183.85	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.09	79 Au 196.967	80 Hg 200.59	81 Tl 204.37	82 Pb 207.19	83 Bi 208.980	84 Po (210)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	‡89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 ? (271)	111 ? (272)	112 ? (277)						

Numbers in parenthesis are mass numbers of most stable or most common isotope.

Atomic weights corrected to conform to the 1963 values of the Commission on Atomic Weights.

The group designations used here are the former Chemical Abstract Service numbers.

* Lanthanide Series

58 Ce 140.12	59 Pr 140.907	60 Nd 144.24	61 Pm (147)	62 Sm 150.35	63 Eu 151.96	64 Gd 157.25	65 Tb 158.924	66 Dy 162.50	67 Ho 164.930	68 Er 167.26	69 Tm 168.934	70 Yb 173.04	71 Lu 174.97

‡ Actinide Series

90 Th 232.038	91 Pa (231)	92 U 238.03	93 Np (237)	94 Pu (242)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (249)	99 Es (254)	100 Fm (253)	101 Md (256)	102 No (256)	103 Lr (257)