CHEM 130 **Name** ______________________________

Quiz 4 – September 16, 2016

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

1. Determine the mass percent of oxygen in the mineral malachite, $Cu_2(OH)_2CO_3$. (8 pts)

Molar mass of malachite is 221.116 g/mol, each mole of malachite contains 2 moles of copper, or 5 x 15.9994 g =79.997 g oxygen, so the mass % oxygen is:

$$\frac{79.997 \text{ g O}}{221.116 \text{ g malachite}} \times 100\% = \mathbf{36.18\ \%\ O}$$

Answer_____**36.18 % O** _____

2. Complete the table below. (8 pts.)

Name	Formula	Name	Formula
ammonium carbonate	$(NH_4)_2CO_3$	magnesium chloride hexahydrate	$MgCl_2$•$6H_2O$
barium hydroxide	$Ba(OH)_2$	dihydrogen monoxide	H_2O
chromium (VI) sulfide	CrS_3	sulfur hexafluoride	SF_6
dinitrogen tetroxide	N_2O_4	cobalt (III) chromate	$Co_2(CrO_4)_3$

3. Acetylene (C_2H_4) is often used in torches for metal cutting and welding. Consider the *unbalanced* reaction for the combustion of acetylene below. How many grams of oxygen are required to consume 15.30 grams of acetylene? (9 pts)

$$C_2H_4 + O_2 \rightarrow CO_2 + H_2O$$

First balance the reaction:

$$C_2H_4 + 3\ O_2 \rightarrow 2\ CO_2 + 2\ H_2O$$

Now do the stoichiometry

$$\text{g } C_2H_4 \rightarrow \text{mol } C_2H_4 \rightarrow \text{mol } O_2 \rightarrow \text{g } O_2$$

$$15.30\ \cancel{\text{g } C_2H_4} \times \frac{1\ \cancel{\text{mol } C_2H_4}}{28.034\ \cancel{\text{g } C_2H_4}} \times \frac{3\ \cancel{\text{mol } O_2}}{1\ \cancel{\text{mol } C_2H_4}} \times \frac{31.999\text{ g } O_2}{1\ \cancel{\text{mol } O_2}} = \mathbf{52.3547\ g\ O_2}$$

Answer____**52.35 g O_2**_____

Possibly Useful Information

% by mass = $\frac{\text{g component}}{\text{100 g sample}}$	d = m/v	$N_A = 6.022 \times 10^{23}$

1 1A	2 2A	3 3B	4 4B	5 5B	6 6B	7 7B	8 8B	9	10	11 1B	12 2B	13 3A	14 4A	15 5A	16 6A	17 7A	18 8A
1 H 1.00794																	2 He 4.00260
3 Li 6.941	4 Be 9.01218											5 B 10.811	6 C 12.011	7 N 14.0067	8 O 15.9994	9 F 18.9984	10 Ne 20.1797
11 Na 22.9898	12 Mg 24.3050											13 Al 26.9815	14 Si 28.0855	15 P 30.9738	16 S 32.066	17 Cl 35.4527	18 Ar 39.948
19 K 39.0983	20 Ca 40.078	21 Sc 44.9559	22 Ti 47.88	23 V 50.9415	24 Cr 51.9961	25 Mn 54.9381	26 Fe 55.847	27 Co 58.9332	28 Ni 58.693	29 Cu 63.546	30 Zn 65.39	31 Ga 69.723	32 Ge 72.61	33 As 74.9216	34 Se 78.96	35 Br 79.904	36 Kr 83.80
37 Rb 85.4678	38 Sr 87.62	39 Y 88.9059	40 Zr 91.224	41 Nb 92.9064	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.906	46 Pd 106.42	47 Ag 107.868	48 Cd 112.411	49 In 114.818	50 Sn 118.710	51 Sb 121.757	52 Te 127.60	53 I 126.904	54 Xe 131.29
55 Cs 132.905	56 Ba 137.327	57 *La 138.906	72 Hf 178.49	73 Ta 180.948	74 W 183.84	75 Re 186.207	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.967	80 Hg 200.59	81 Tl 204.383	82 Pb 207.2	83 Bi 208.980	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra 226.025	89 †Ac 227.028	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (277)	109 Mt (268)	110 Ds (271)	111 Rg (272)							

*Lanthanide series	58 Ce 140.115	59 Pr 140.908	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.965	64 Gd 157.25	65 Tb 158.925	66 Dy 162.50	67 Ho 164.930	68 Er 167.26	69 Tm 168.934	70 Yb 173.04	71 Lu 174.967
†Actinide series	90 Th 232.038	91 Pa 231.036	92 U 238.029	93 Np 237.048	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)