CHEMISTRY 101
FIRST EXAM (131)

Name:_____ **Date: 30/10/2013**

Student no. _____ **Section:** _____

Useful Information: *Avogadro's number = 6.02 x 10^{23}*

H[1] 1.000																	**He**[2] 4
Li[3] 6.941	**Be**[4] 9.012											**B**[5] 10.81	**C**[6] 12.01	**N**[7] 14.01	**O**[8] 16	**F**[9] 19	**Ne**[10] 20.18
Na[11] 22.99	**Mg**[12] 24.31											**Al**[13] 26.98	**Si**[14] 28.09	**P**[15] 30.97	**S**[16] 32.06	**Cl**[17] 35.45	**Ar**[18] 39.95
K[19] 39.10	**Ca**[20] 40.08	**Sc**[21] 44.96	**Ti**[22] 47.9	**V**[23] 50.94	**Cr**[24] 51.99	**Mn**[25] 54.94	**Fe**[26] 55.85	**Co**[27] 58.93	**Ni**[28] 58.71	**Cu**[29] 63.54	**Zn**[30] 65.37	**Ga**[31] 69.72	**Ge**[32] 72.59	**As**[33] 74.92	**Se**[34] 78.96	**Br**[35] 79.9	**Kr**[36] 83.8
Rb[37] 85.47	**Sr**[38] 87.62	**Y**[39] 88.91	**Zr**[40] 91.22	**Nb**[41] 92.91	**Mo**[42] 95.94	**Tc**[43] 99.91	**Ru**[44] 101.1	**Rh**[45] 102.91	**Pd**[46] 106.4	**Ag**[47] 107.87	**Cd**[48] 112.4	**In**[49] 114.8	**Sn**[50] 118.69	**Sb**[51] 121.75	**Te**[52] 127.6	**I**[53] 126.9	**Xe**[54] 131.3
Cs[55] 132.9	**Ba**[56] 137.3	**57-71** *	**Hf**[72] 178.5	**Ta**[73] 180.9	**W**[74] 183.85	**Re**[75] 186.2	**Os**[76] 190.2	**Ir**[77] 192.2	**Pt**[78] 195.1	**Au**[79] 196.97	**Hg**[80] 200.6	**Tl**[81] 204.37	**Pb**[82] 207.2	**Bi**[83] 208.98	**Po**[84] 210	**At**[85] 210	**Rn**[86] 222

Write the best fit answer of the following questions in this table:

Q1 (1 pt)	Q2 (1 pt)	Q3 (1 pt)	Q4 (1 pt)	Q5 (1 pt)	Q6 (1.5 pt)	Q7 (1 pt)	Q8 (1 pt)
Q9 (1 pt)	**Q10 (1 pt)**	**Q11 (1 pt)**	**Q12 (1.5 pt)**	**Q13 (1 pt)**	**Total (13)**		

1. Perform the following arithmetic and express the answer in scientific notation rounded to the proper number of significant figures. Assume all values come from measurements:

$$3.38 \times 0.012 = A$$
$$A \times 0.381 = D$$

The value of D is:

a) 1.5×10^{-2} b) 1.6×10^{-2} c) 1.545×10^{-2} d) 1.55×10^{-2}

2. Hematite (Iron ore) weighing 70.7 g was placed in a flask. The flask with hematite was filled with water and weighed. The weight of them was 109.3 g and their final volume was 53.2 mL. Calculate the density (g/mL) of hematite, given that the density of water was 0.997 (g/mL):

a) 0.55 b) 1.33 c) 0.76 d) 4.88

3. The masses of diamonds are measured by carats. A carat is defined as 200 mg. If a jeweler has 275 carats, ***what mass of diamond (in kg) does he have?***

a) 55.000 b) 55,000 c) 0.055 d) 5.500

4. Give an example for each of the following:
   - A binary compound composes of a nonmetal in 1A group and a halide which has atomic mass of 79.9 amu…….
   - A metalloid in group 6A……..
   - An element in group 3A and the third period……...
   - A molecule which is neither compound nor element……

5. A monatomic ion has a charge of +2. The nucleus of the ion has the mass number of 62. If the number of neutrons is 1.21 times that of the protons. What is the symbol of this ion:

a) 55.000 b) 55,000 c) 0.055 d) 5.500

6. Fill in the blank:
   - The formula of Iron(III) acetate is**.....**
   - The name of BeO_2 is……
   - The formula of Mercury(I) chloride is…….
   - The name of $Mg(ClO_4)_2.6H_2O$ is……

7. The number of bromine *molecules* exist in 3.992 g of $Mg(BrO_3)_2$ is:

   a) 4.22×10^{25} b) 1.72×10^{22} c) 4.3×10^{21} d) 8.6×10^{21}

8. A 1.175 g of an alloy containing Ag gave by series of reactions 1.449 g AgCl. Calculate the percentage composition of silver in the alloy:

   a) 46.43% b) 92.81% c) 75.210% d) 0.929%

9. Calculate the number of hydrogen atoms required to react completely with 14 g of nitrogen according to the following equation:

   $$3\,H_2 + N_2 \rightarrow 2NH_3$$

   a) 9.033×10^{23} b) 6.022×10^{23} c) 1.807×10^{24} d) 3.614×10^{24}

10. If 5.0 g of metal oxide contains 4.0 g of metal M whose atomic mass is 96, then the empirical formula of the metal oxide is:

    a) MO b) MO_2 c) M_2O_3 d) M_3O_4

11. Calculate the percentage yield of CCl_4 obtained, if 32.0 g of CH_4 were allowed to react with ***excess*** chlorine and gave 231.0 g of CCl_4:

    $$CH_4 + Cl_2 \rightarrow CCl_4 + 4HCl$$

    a) 75% b) 50% c) 100% d) 25%

12. A precipitation reaction was carried out by adding 100 mL of water to 1.0 g of a salt mixture of $Pb(NO_3)_2$ and NaI according to the following equation:

    $$Pb(NO_3)_{2(aq)} + 2\,NaI_{(aq)} \rightarrow PbI_{2(s)} + 2\,NaNO_{3(aq)}$$

    If 0.30 g of PbI2 was collected at the end of the reaction. ***Given that NaI was exist in excess.***

    - Calculate the percentage of $Pb(NO_3)_2$ in the salt mixture:

    - Claculte the mass of NaI that left over as excess at the end of the reaction:

13. Element X has two naturally occurring isotopes, ^{20}X (20.021 amu) and ^{21}X (20.998 amu). If the average atomic mass of X is 20.800 amu, then the abundances of ^{20}X and ^{21}X respectively are:

    a) 20.26%, 79.74% b) 50%, 50% c) 79.74%, 20.26% d) 18.18%, 81.82%

-GOOD LUCK-