CHEMISTRY 101
FIRST EXAM (132)

Name:_____

Date: 19/3/2014

Student no. _____

Section:_____

Useful Information: *Avogadro's number = 6.02 x 10²³*

H¹ 1.000																	He² 4
Li³ 6.941	Be⁴ 9.012											B⁵ 10.81	C⁶ 12.01	N⁷ 14.01	O⁸ 16	F⁹ 19	Ne¹⁰ 20.18
Na¹¹ 22.99	Mg¹² 24.31											Al¹³ 26.98	Si¹⁴ 28.09	P¹⁵ 30.97	S¹⁶ 32.06	Cl¹⁷ 35.45	Ar¹⁸ 39.95
K¹⁹ 39.10	Ca²⁰ 40.08	Sc²¹ 44.96	Ti²² 47.9	V²³ 50.94	Cr²⁴ 51.99	Mn²⁵ 54.94	Fe²⁶ 55.85	Co²⁷ 58.93	Ni²⁸ 58.71	Cu²⁹ 63.54	Zn³⁰ 65.37	Ga³¹ 69.72	Ge³² 72.59	As³³ 74.92	Se³⁴ 78.96	Br³⁵ 79.9	Kr³⁶ 83.8
Rb³⁷ 85.47	Sr³⁸ 87.62	Y³⁹ 88.91	Zr⁴⁰ 91.22	Nb⁴¹ 92.91	Mo⁴² 95.94	Tc⁴³ 99.91	Ru⁴⁴ 101.1	Rh⁴⁵ 102.91	Pd⁴⁶ 106.4	Ag⁴⁷ 107.87	Cd⁴⁸ 112.4	In⁴⁹ 114.8	Sn⁵⁰ 118.69	Sb⁵¹ 121.75	Te⁵² 127.6	I⁵³ 126.9	Xe⁵⁴ 131.3
Cs⁵⁵ 132.9	Ba⁵⁶ 137.3	57-71 *	Hf⁷² 178.5	Ta⁷³ 180.9	W⁷⁴ 183.85	Re⁷⁵ 186.2	Os⁷⁶ 190.2	Ir⁷⁷ 192.2	Pt⁷⁸ 195.1	Au⁷⁹ 196.97	Hg⁸⁰ 200.6	Tl⁸¹ 204.37	Pb⁸² 207.2	Bi⁸³ 208.98	Po⁸⁴ 210	At⁸⁵ 210	Rn⁸⁶ 222

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

Q1 (1 pt)	Q2 (0.75 pt)	Q3 (1 pt)	Q4 (1 pt)	Q5 (0.75 pt)	Q6 (1 pt)	Q7 (1.5 pt)	Q8 (1.5 pt)

Q9 (1 pt)	Q10 (1 pt)	Q11 (2.25 pt)	Q12 (1.25 pt)	Total (13)			

1. Choose the correct answer:
   - The metalloid among the following (Sn, Sb, Ga, Al) is……………………………
   - The element which has similar properties to carbon among the following (B, Be, Si, S) is……………………………………………………………………………………...
   - The transition metal among the following (Ge, K, N, Hg) is………………………
   - The alkali metal amomg the following (Cs. Sc, Cu, Al) is…………………………

2. A monatomic ion of an element has 23 electrons. If one isotope of this element has the mass number of 54 and 28 neutrons. What is the symbol of this ion:

   a) Ni^{5+} b) Sc^{3+} c) Fe^{3+} d) Fe^{3-}

3. Assuming all numbers are measured quantities, perform the following arithmetic and give the answer in scientific notation rounded to the proper number of significant figures:

   (19.46 – 8.5) x 0.05 =?

   a) 5.5×10^{-1} b) 5.48×10^{-1} c) 5×10^{-1} d) 6×10^{-1}

4. The element Magnesium (Mg) has three stable isotopes: ^{24}Mg, ^{25}Mg, and ^{26}Mg. If the masses and the abundances of two of them are given as the following: ^{24}Mg (23.9850 amu, 78.99%), ^{25}Mg (24.9585 amu, 10.00%). Calculate the mass of the third isotope (^{26}Mg):
   ....
   ....

5. A compound composes of two elements which are Sulfur (S) and Oxygen (O). If the percent composition of sulfur in the compound is 50%, what is the empirical formula of the compound:

   a) SO   b) SO_2 c) SO_3 d) SO_4

6. A metallic rectangular prism has the mass1.52 g and the dimensions of: Base (b) = 5.5 mm, height (h) = 6.8 mm, and length (l) = 9.9 mm. Calculate the density of the prism in (*g/mL.*) *Given that the volume of prism = ½ bhl*:

   a) 8.21   b) 8.0   c) 8   d) 4.11

7. Write the chemical formula for each of the following compounds:
   - Diammonium sulfide………………………………………………………………….
   - Barium hypochlorite……………………………………………………………….....
   - Aluminum acetate…………………………………………………………………......

8. Write the name of the following compounds:

- C_8H_{18}...
- Hg_2O_2...
- $CuCr_2O_7.2H_2O$...

9. The sum of all coefficients (reactants and products) in the chemical reaction which represents the combustion of glucose ($C_6H_{12}O_6$) is:

a) 19　　　　　　b) 18　　　　　　c) 22　　　　　　d) 13

10. Which of the following has the largest number of *hydrogen molecules:*

a) 1.2 g of B_2H_6　　b) 1.0 g of C_2H_4　　c) 4.0 g of H_2S　　d) 1.0 g of CH_4

11. Diborane, B_2H_6, is manufactured according to the following equation:

$$3\ NaBH_4(s) + 4\ BF_3(g) \rightarrow 3\ NaBF_4(s) + 2\ B_2H_6(g)$$
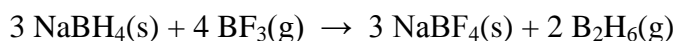
When 26.5 g of $NaBH_4$ and 45.6 g of BF_3 were mixed the percentage yield of B_2H_6 was 80%. Depending on this information answer the following questions:

- What was the limiting reactant...
....
....
....
- Calculate the experimental mass of B_2H_6 which was obtained from the previous reaction...
....
....
- Calculate the mass of excess reactant which will be left over theoretically (will not react)...
....
....

12. A 1.5 g sample of a compound composed of chromium (Cr) and chlorine (Cl) was reacted with silver nitrate ($AgNO_3$). This converted all chlorine in the sample into 4.072 g of silver chloride (AgCl). What is the empirical formula chromium chlorine compound:

a) CrCl　　　　　b) $CrCl_2$　　　　　c) $CrCl_3$　　　　　d) Cr_2Cl_3

-GOOD LUCK-