CHEMISTRY 101
SECOND EXAM(121)

Name:_____ **Date: 16/12/2012**

Student no. _____ **Section:**_____

Useful Information: *Gas Constant R= 0.08206 L.atm/K.mol*

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	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Q9	**Q10**	**Q11**	**Q12**	**Q13**	**Total (12)**		

1. If the oxidation number of chromium (Cr) is (3+), then one of the following representations is correct:

a. CrO_2 b. $HCrCl_4$ c. Cr_3O_2 d. $K_2Cr_2O_7$

2. One of the following reactions does not represent ***redox*** reaction:

a. $2Al + 6HCl \longrightarrow 3H_2 + 2AlCl_3$

b. $2H_2O \longrightarrow 2H_2 + O_2$

c. $2NaCl + Pb(NO_3)_2 \longrightarrow PbCl_2 + 2NaNO_3$

d. $2NaI + Br_2 \longrightarrow 2NaBr + I_2$

3. Aluminum reacts with excess H_2SO_4 according to the following equation:

$$Al + H_2SO_4 \longrightarrow Al_2(SO_4)_3 + H_2$$ **(Unbalanced)**

The Volume of a 0.1 M acid required to react completely with 1 g aluminum is:

a. 370.4 mL b. 555.6 mL c. 740.8 mL d. 200.0 mL

4. Calculate ΔH for the reaction:

$$\boldsymbol{C_{(graphite)} + 2H_{2(g)} + \frac{1}{2} O_{2(g)} \longrightarrow CH_3OH_{(l)}}$$

Given the following reactions and their respective enthalpy changes:

	ΔH/kJ
$CH_3OH_{(l)} + 3/2O_{2(g)} \longrightarrow CO_{2(g)} + 2H_2O_{(l)}$	-726.4
$C_{(graphite)} + O_{2(g)} \longrightarrow CO_{2(g)}$	-393.5
$H_{2(g)} + 1/2O_{2(g)} \longrightarrow H_2O_{(l)}$	-285.8

a. -834.1 kJ b. -618.7 kJ c. -238.7 d. 47.1 kJ

5. If 60 ml of water was added to 120 mL of 0.450 M KCl solution. What was the molarity of the resulting solution:

a. 0.600 M b. 0.150 M c. 0.225 M d. 0.300 M

6. If 10 ml of 0.2 M NaOH solution required to neutralize a sample of 0.1 M phosphoric acid (H_3PO_4). What was the Volume of the acid:

a. 6.67 mL b. 20.00 mL c. 60.00 mL d. 13.32 mL

7. If the density of Argon gas (Ar) at -5 °C equals 1 g/L, its pressure (in atm) at the same temperature will be:

a. 1.0 b. 11 c. 5.5 d. 0.55

8. Consider the reaction:

$2H_2O \longrightarrow 2H_2 + O_2$ $\Delta\mathbf{H = +483.6\ KJ/mol}$

At a certain temperature. If the increase in volume is 32.7 L against an external pressure of 1.00 atm, calculate $\Delta\mathbf{U}$ for this reaction. (Hint: 1 L. atm = 101.3 J)

a. 963.9 KJ b. 480.3 KJ c. 483.6 KJ d. 450.9 KJ

9. A sheet of gold weighing 10.0 g and at a temperature of 18.0 °C is placed flat on a sheet of iron weighing 20.0 g and at a temperature of 55.6 °C. What is the final temperature of the combined metals: (Specific Heat of Au= 0.129, Fe= 0.444 **J/g. °C**)

a. 61.9 °C b. 52.9 °C c. 50.8 °C d. 68.1 °C

10. A 370 mL sample of oxygen is collected over water at 23 °C and a pressure of 0.992 atm. If the vapor pressure of water at 23 °C is 0.028 atm. Then the volume of this sample of dry oxygen will occupy at STP is:

a. 329 mL b. 311 mL c. 387 mL d. 416 mL

11. A sample of N_2 gas is placed into 0.29 L flask at 25 °C if 0.1 g of O_2 is added so that the total pressure in the flask is 101 KPa, calculate:

The pressure of N_2 gas:……

The mass of N_2 gas:……

12. The Volume of a sample of gas is 750 mL at 75 °C and 0.750 atm. At what temperature will the sample occupy 1.00 L under a pressure of 1.00 atm.

a. 618.7 K b. 415.0 K c. 215.0 K d. 298 K

13. Copper metal may be oxidized to a Cu^{1+} ion by the following equation:

$\mathbf{2Cu + 2HCl \longrightarrow 2CuCl + H_2}$

If 6.4 g of Cu is Oxidized, what volume of Hydrogen (**at STP**) is evolved:

a. 22.4 L b. 12.2 L c. 0.05 L d. 1.1 L

-GOOD LUCK-