Chem. 101	1st Hour Exam	Date: 31/3/2009	Time: 60 Min

اسم الطالب: .... رقم الطالب: .... الشعبة و المدرس: ⟩ ⟨

Useful Constants: Avogadro's constant $= 6.023 \times 10^{23}$ mol^{-1}

1 1A	2 2A	3	4	5	6	7	8	9	10	11	12	13 3A	14 4A	15 5A	16 6A	17 7A	18 8A
1 **H** 1.008																	2 **He** 4.003
3 **Li** 6.941	4 **Be** 9.012											5 **B** 10.81	6 **C** 12.01	7 **N** 14.01	8 **O** 16.00	9 **F** 19.00	10 **Ne** 20.18
11 **Na** 22.99	12 **Mg** 24.31											13 **Al** 26.98	14 **Si** 28.09	15 **P** 30.97	16 **S** 32.07	17 **Cl** 35.45	18 **Ar** 39.95
19 **K** 39.10	20 **Ca** 40.08	21 **Sc** 44.96	22 **Ti** 47.88	23 **V** 50.94	24 **Cr** 52.00	25 **Mn** 54.94	26 **Fe** 55.85	27 **Co** 58.93	28 **Ni** 58.69	29 **Cu** 63.55	30 **Zn** 65.38	31 **Ga** 69.72	32 **Ge** 72.59	33 **As** 74.92	34 **Se** 78.96	35 **Br** 79.90	36 **Kr** 83.80
37 **Rb** 85.47	38 **Sr** 87.62	39 **Y** 88.91	40 **Zr** 91.22	41 **Nb** 92.91	42 **Mo** 95.94	43 **Tc** (98)	44 **Ru** 101.1	45 **Rh** 102.9	46 **Pd** 106.4	47 **Ag** 107.9	48 **Cd** 112.4	49 **In** 114.8	50 **Sn** 118.7	51 **Sb** 121.8	52 **Te** 127.6	53 **I** 126.9	54 **Xe** 131.3
55 **Cs** 132.9	56 **Ba** 137.3	57 **La*** 138.9	72 **Hf** 178.5	73 **Ta** 180.9	74 **W** 183.9	75 **Re** 186.2	76 **Os** 190.2	77 **Ir** 192.2	78 **Pt** 195.1	79 **Au** 197.0	80 **Hg** 200.6	81 **Tl** 204.4	82 **Pb** 207.2	83 **Bi** 209.0	84 **Po** (209)	85 **At** (210)	86 **Rn** (222)
87 **Fr** (223)	88 **Ra** 226	89 **Ac**† (227)															

1.	A	B	C	D	E	8.	A	B	C	D	E
2.	A	B	C	D	E	9.	A	B	C	D	E
3.	A	B	C	D	E	10.	A	B	C	D	E
4.	A	B	C	D	E	11.	A	B	C	D	E
5.	A	B	C	D	E	12.	A	B	C	D	E
6.	A	B	C	D	E	13.	A	B	C	D	E
7.	A	B	C	D	E						

1. How many atoms of hydrogen are present in 3.0 g of water?
   A) 1.0×10^{23}
   B) 9.0×10^{23}
   C) 3.6×10^{23}
   D) 2.0×10^{23}
   E) 0.33

2. How many grams of NaCl are contained in 350. mL of a 0.200 M solution of sodium chloride?
   A) 11.7 g
   B) 4.09 g
   C) 8.18 g
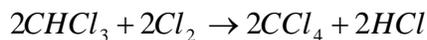   D) 70.0 g
   E) None of these

3. Using the rules of significant figures, calculate the following:
   $$\frac{6.167 + 75}{5.10}$$
   A) 15.9
   B) 17
   C) 16
   D) 91
   E) 15.92

4. A student weighs out 0.673 g of KHP (molar mass = 204 g/mol) and titrates to the equivalence point with 36.78 mL of a stock NaOH solution. What is the concentration of the stock NaOH solution? KHP is an acid with one acidic proton.
   A) 3.30×10^{-3} M.
   B) 0.102 M.
   C) 0.0183 M.
   D) 0.0897 M.
   E) None of these.

5. The net ionic equation for the reaction of calcium bromide and sodium phosphate contains which of the following species?
   A) $Ca^{2+}_{(aq)}$
   B) $PO_4^{3-}_{(aq)}$
   C) $2Ca_3(PO_4)_{2(s)}$
   D) $6NaBr_{(aq)}$
   E) $3Ca^{2+}_{(aq)}$

6. The melting point of lead is 402 °C. What is this on the Fahrenheit scale?
   $$(T_F = T_C \times (9°F / 5°C) + 32°F)$$
   A) 675 °F
   B) 800 °F
   C) 1030 °F
   D) 756 °F
   E) 692 °F

7. Gallium consists of two isotopes of masses 68.95 amu and 70.95 amu with abundances of 60.16% and 39.84%, respectively. What is the average atomic mass of gallium?
   A) 69.95
   B) 70.15
   C) 71.95
   D) 69.75
   E) 69.55

8. Determine the coefficient for O_2 when the following equation is balanced in standard form (smallest whole number integers)
   $$C_4H_{10}(g) + O_2(g) \rightarrow CO_2(g) + H_2O(g)$$
   A) 4
   B) 8
   C) 10
   D) 13
   E) 20

9. You have 75.0 mL of a 2.50 M solution of $Na_2CrO_4(aq)$. You also have 125 mL of a 2.07 M solution of $AgNO_3(aq)$. Calculate the concentration of CrO_4^{2-} when the two solutions are added together.
   A) 0.00 M
   B) 0.291 M
   C) 0.189 M
   D) 0.259 M
   E) 2.50 M

10. The reaction of 11.9 g of $CHCl_3$ with excess chlorine produced 10.7 g of CCl_4, carbon tetrachloride:

$$2CHCl_3 + 2Cl_2 \rightarrow 2CCl_4 + 2HCl$$

What is the percent yield?
A) 100. %
B) 34.9 %
C) 69.8 %
D) 90 %
E) 46.5 %

11. Which of the following aqueous solutions contains the greatest number of ions?
A) 400.0 mL of 0.10 M NaCl
B) 300.0 mL of 0.10 M CaCl₂
C) 200.0 mL of 0.10 M $FeCl_3$
D) 200.0 mL of 0.10 M KBr
E) 800.0 mL of 0.10 M sucrose

12. How many of the following salts are expected to be insoluble in water?
    Sodium sulfide (Na_2S)
    Barium nitrate $Ba(NO_3)_2$
    Ammonium sulfate $((NH_4)_2SO_4$
    Rubidium phosphate Rb_3PO_4
    Potassium carbonate K_2CO_3
A) None
B) 1
C) 2
D) 3
E) 4

13. Adipic acid contains 49.32% C, 43.84% O, and 6.85% H by mass. What is the empirical formula?
A) C₃H₅O₂
B) $C_3H_3O_4$
C) C_2HO_3
D) $C_2H_5O_4$
E) C_3HO_3

GOOD LUCK!