Chem 201-04 **EXAM II** **September 25, 2017**

PRINT NAME _____

SIGN NAME _____

CIRCLE your recitation section in the list below.

A:	W	3:00	HM 217	B:	F	10:00	LF 102
C:	F	8:00	LF 130	D:	M	8:00	LF 130
E:	M	9:00	LF 130	F:	T	3:00	HM 221
G:	W	8:00	LF 130	H:	Th	12:00	NS 317

SCORED GRADE: _____

All answers should be with the correct significant figures.

Atomic weights are provided in the Periodic Table. These values must be used.

The Periodic Table will not be collected. It may be used as scratch paper or as cover paper. Do not turn it in.

Be certain your answers are clear. If an answer is not clear, it can be considered wrong.

Problems marked with ** in the margin are from the assigned homework. These total 28 points.

Place your name in the space provided at the top of each question page. This helps to identify the pages if they are accidentally separated during grading and processing.

Work promptly. Use your time effectively.

SOLUBILITY TRENDS FOR IONIC COMPOUNDS

For purposes of this course, we will use the following trends to predict whether a compound is soluble or insoluble. These guidelines are given in a priority sequence: use them in this order.

1. Group 1 compounds and ammonium compounds tend to be soluble.
2. Nitrates, acetates, chlorates, and perchlorates tend to be soluble.
3. Silver, lead, mercury(I) and copper(I) compounds tend to be INSOLUBLE.
4. Chlorides, bromides, and iodides tend to be soluble.
5. Sulfates tend to be soluble except calcium sulfate, strontium sulfate and barium sulfate.
6. Compounds with anions of 2– or 3– charge tend to be INSOLUBLE.
7. Hydroxides tend to be INSOLUBLE except calcium hydroxide, strontium hydroxide and barium hydroxide.

last name: _____

KEEP YOUR WORK AND ANSWERS COVERED.

1. (24 pts) Indicate whether each statement is true (T) or false (F). Be certain T or F is clearly indicated.

_____ The theoretical yield of a product is always the amount which is obtained after completion of all work-up steps.

_____ In a solution of KBr(*aq*), individual ions of K^+ and of Br^- interact with solvent water molecules.

_____ The total hydration energy for $MgCl_2$ in water is stronger than the ionic bonding within the ionic network of the solid.

_____ Water can dissociate some covalent molecules into ions.

_____ HNO_3 can protonate water.

_____ Barium hydroxide is a strong base.

_____ Reaction of $FeSO_4$ with nitric acid produces $SO_2(g)$ as one of the products.

_____ In the combustion of methane, methane is reduced.

** 2. (6 pts) Indicate whether each of the following is a strong acid (SA) or a weak acid (WA).

HI _____ HNO_2 _____ H_2SO_4 _____

3. (5 pts) Consider 250. mL of a solution of 0.375 M ammonium iodide. Circle the number of grams of ammonium iodide that are contained in the solution.

4.90	5.18	6.77	7.36	8.53	9.05
10.2	11.8	12.9	13.6	14.0	15.1

last name: _____

KEEP YOUR WORK AND ANSWERS COVERED.

4. (6 pts) The following equation is balanced.

$$3\ SiCl_4(l) + 2\ Al_2O_3(s) \rightarrow 3\ SiO_2(s) + 4\ AlCl_3(s)$$

For the reaction of 11.8 mL of $SiCl_4$, circle the amount (in g) of Al_2O_3 which is needed. The density of $SiCl_4$ is 1.48 g/mL.

6.99	7.51	8.82	9.18	10.5	11.6
12.3	13.9	14.0	15.7	16.8	17.1

** 5. (6 pts) Circle the compounds below which are soluble in water.

$MgSO_4$ $K_2S_2O_3$ $CuClO_4$ NH_4HS $Fe(NO_3)_3$

** 6. (7 pts) The following equation is balanced.

$$S_4N_4 + 4\ Ag_2O \rightarrow 4\ Ag_2S + 4\ NO$$

The reaction is conducted beginning with 12.48 g S_4N_4 and 74.23 g Ag_2O. Circle the amount (in g) of NO which can be made.

6.001	6.832	7.722	7.406	8.128	8.607
9.351	9.610	10.11	10.48	11.32	11.87

last name: _____

KEEP YOUR WORK AND ANSWERS COVERED.

** 7. (3 pts) Give the formula of oxalic acid. _____

(3 pts) What is the formula of the precipitate which is formed upon mixing a solution of $Co(NO_3)_2$ and a solution of Na_2CO_3? _____

(3 pts) What is the formula of the salt produced in the reaction of hydrochloric acid and calcium hydroxide? _____

8. (6 pts) Give the oxidation number for each element in each substance below.

$Na_4P_2O_7$ Na: _____ P: _____ O: _____

HBF_4 H: _____ B: _____ F: _____

9. (6 pts) The following equation is balanced.

$$FeO(s) + 2\,NH_4Cl(aq) \rightarrow FeCl_2(aq) + H_2O(l) + 2\,NH_3(g)$$

Write the net ionic equation. (You can leave out phases.) Put your final answer in the box below. Only that will be graded.
