Name _____   Block: _____   Date: _____

Chemistry 12
QUALITATIVE ANALYSIS & KSP CALCULATIONS

1.   A solution which contains only one of the following anions: I^-, SO_4^{2-}, or OH^- is
      tested with various reagents and the following results are obtained:

Reagent	Results
0.2M $AgNO_3$	precipitate
0.2M $Fe(NO_3)_2$	no precipitate
0.2M $Sr(NO_3)_2$	no precipitate

Which anion does the solution contain? _____

2.   A solution which contains only one of the following anions: OH^-, SO_4^{2-}, or CO_3^{2-} is tested
      with various reagents and the following results are obtained:

Reagent	Results
0.2M $AgNO_3$	precipitate
0.2M $Fe(NO_3)_2$	precipitate
0.2M $Sr(NO_3)_2$	no precipitate

Which anion does the solution contain? _____

3.   A solution which contains only one of the following cations: Mg^{2+}, Pb^{2+}, or NH_4^+ is
      tested with various reagents and the following results are obtained:

Reagent	Results
0.2M Na_2SO_4	precipitate
0.2M Na_2S	precipitate
0.2M $NaNO_3$	no precipitate

Which cation does the solution contain? _____

4.   A solution which contains only one of the following cations: Ca^{2+}, Cu^+, or Sr^{2+} is tested
      with various reagents and the following results are obtained:

Reagent	Results
0.2M Na_2SO_4	no precipitate
0.2M $NaBr$	precipitate
0.2M $NaNO_3$	no precipitate

Which cation does the solution contain? _____

5.   A solution contains Fe^{3+}, Ca^{2+}, Cu^+, and Be^{2+}. What ***compounds*** (give correct formula for each compound) could be added, and ***in what order***, to separate these ions. Answer this question by filling in the following chart:

First compound - _____

Net-ionic equation for the precipitation reaction: _____

Second compound - _____

Net-ionic equation for the precipitation reaction: _____

Third compound - _____

Net-ionic equation for the precipitation reaction: _____

Fourth compound - _____

Net-ionic equation for the precipitation reaction: _____

6.   A saturated solution of BaF_2 has a $[F^-]$ of 8.6×10^{-3}M at a certain temperature. Calculate the Ksp at this temperature. Show all your steps in a logical manner.

7.   Calculate the $[Mg^{2+}]$ in a saturated solution of $Mg(OH)_2$ at 25°C. Show all your steps in a logical manner.

8.   Calculate the mass of $AgIO_3$ which will dissolve in 2.50 L of water at 25°C. Show all your steps in a logical manner.

9.   At a certain temperature 2.2×10^{-4} grams of CuI will dissolve in 1.0 L of water. Calculate the Ksp for CuI at this temperature. Show all your steps in a logical manner.

10.   Calculate the molar solubility of silver chromate in water at 25°C. Show all your steps in a logical manner.

11.   At a certain temperature 0.0558 grams of SrF_2 will dissolve in 500.0 mL of water. Calculate the Ksp for SrF_2 at this temperature. Show all your steps in a logical manner.

12.   Which is **most** soluble in water at 25 °C, lead (II) bromide, lead (II) chloride, lead (II) iodide, or lead (II) iodate? (2 marks)

      Answer _____. How did you obtain your answer?   _____

      _____

13.   Which is **least** soluble in water at 25 °C, lead (II) bromide, lead (II) chloride, lead (II) iodide, or lead (II) iodate? (2 marks)

      Answer _____. How did you obtain your answer?   _____

      _____