Solubility Review

***All substances in each equation should have states written!**

1. Write a balanced chemical equation for the equilibrium in a saturated solution of an ionic compound with low solubility.

2. Write the dissociation equation and give ionic concentrations for 0.25M $AlCl_3$.
3. Define **solubility**.

4. Define **saturated solution**.

5. Which is better at conducting: a 0.1M NaCl solution or a 1.0M CH_3OH solution. Why?

6. Can a 0.1M solution of $MgCl_2$ at room temperature be a saturated solution? Explain.

7. A solution of $CaBr_2$ is found to have 6.78g of $CaBr_2$ per 250.0 mL of solution. What is the [Br-] in the solution?

8. If a 500.0 mL solution contains 0.050 mol of $Al_2(SO_4)_3$, write a dissociation equation and calculate the molar concentrations of each ion in solution.

9. Devise a method to separate a solution with a mixture of SO_4^{2-}, I^-, and OH^-.

10. Give the formula, complete, and net ionic equation when 0.1M solutions of $Ca(NO_3)_2$ and Na_2SO_4 are mixed.

11. A saturated solution of $AgCH_3COO$ was evapourated to dryness. The 250.0 mL sample was found to contain 1.84g of $AgCH_3COO$. Calculate the Ksp for $AgCH_3COO$.

12. A saturated solution of $Pb(IO_3)_2$ has a concentration of 0.038M. Calculate the solubility product constant for $Pb(IO_3)_2$.

13. What is the solubility of $CaCO_3$ in mol/L?

14. Calculate the solubility of $Ag_2C_2O_4$ in g/L.

15. Calculate the maximum mass (g) of $CaSO_4$ that could dissolve in 50.0L of water.

16. Will a precipitate form if 30.0 mL of 0.054M $Ca(NO_3)_2$ is mixed with 60.0 mL of 8.1×10^{-4}M Na_2SO_4?

17. Will a precipitate form when 90.0 mL of 1.00×10^{-2}M $Cu(NO_3)_2$ and 10.0 mL of 1.00×10^{-2}M $NaIO_3$ are mixed? Explain using appropriate calculations.

18. Calculate the maximum moles of Br^- that can be added to 0.500L of 0.10M $Pb(NO_3)_2$ so a precipitate just starts to form. Then write the net ionic equation for the precipitate formation.

19. Calculate the maximum mass of $Pb(NO_3)_2$ that could be dissolved in 100.0 mL of 0.100M NaCl without forming a precipitate.

20. Consider the following equilibrium:

$$MgCO_{3(s)} \Leftrightarrow Mg^{2+}_{(aq)} + CO_3^{2-}{}_{(aq)}$$

When solid $Ca(NO_3)_2$ is added, more $MgCO_3$ dissolves. Explain.

21. In which of the following is $Ag_2C_2O_4$ likely to be least soluble: pure water, 0.10M K_2CrO_4, or 0.10M $AgNO_3$? Explain.

22. A saturated solution of $CaSO_4$ is prepared by adding excess solute to water.
    a) Write an equation that represents the saturated solution.
    b) Identify a soluble salt that when added to the equilibrium in a) would cause more solid to dissolve. Explain how this would work.

23. A student adds Ag^+ to a solution containing 0.10M Cl^- and 0.10M CO_3^{2-}. Determine the colour of the first precipitate to form, given the following data:

AgCl	white ppt	$K_{sp} = 1.8 \times 10^{-10}$
Ag_2CO_3	yellow ppt	$K_{sp} = 6.2 \times 10^{-12}$

*Hint: use type D strategy

24. In an experiment a student pipettes a sample of saturated $MgBr_2$ solution into a beaker and evapourates the sample to dryness. The following data is recorded:

Volume of saturated $MgBr_2$:	25.00mL
Mass of Beaker:	89.05g
Mass of Beaker and solid	93.47g

Calculate the solubility of $MgBr_2$ in moles per litre.