Exercise 11.2b

Solubility & Saturation

Name: _____

Date: _____ Per: _____

1. Although $Al(OH)_3$ is insoluble in water, NaOH is very soluble. Explain in terms of lattice energies.

_____

_____

2. Which solvent, water or carbon tetrachloride, would you choose to dissolve each of the following:

a. KrF_2 : _____

b. SF_2 : _____

c. SO_2 : _____

d. CO_2 : _____

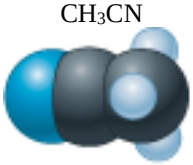
e. MgF_2 : _____

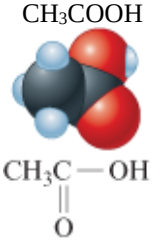
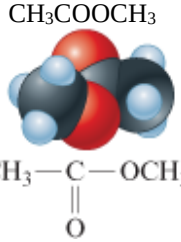
f. CH_2O : _____

g. $H_2C{=}CH_2$: _____

3. For each of the following pairs, predict which substance would be more soluble in water.

a. NH_3  or PH_3  _____

b. CH_3CN  or CH_3CH_3  _____

c. CH_3COOH  or CH_3COOCH_3  _____

4. Rationalize the trend in water solubility for the following simple alcohols:

Alcohol	Solubility (g/100 g H_2O at 20°C)
Methanol, CH_3OH	Soluble in all proportions
Ethanol, CH_3CH_2OH	Soluble in all proportions
Propanol, $CH_3CH_2CH_2OH$	Soluble in all proportions
Butanol, $CH_3(CH_2)_2CH_2OH$	8.34
Pentanol, $CH_3(CH_2)_3CH_2OH$	2.64
Hexanol, $CH_3(CH_2)_4CH_2OH$	0.59
Heptanol, $CH_3(CH_2)_5CH_2OH$	0.09

_____

_____

AP Chemistry

Exercise 11.2b

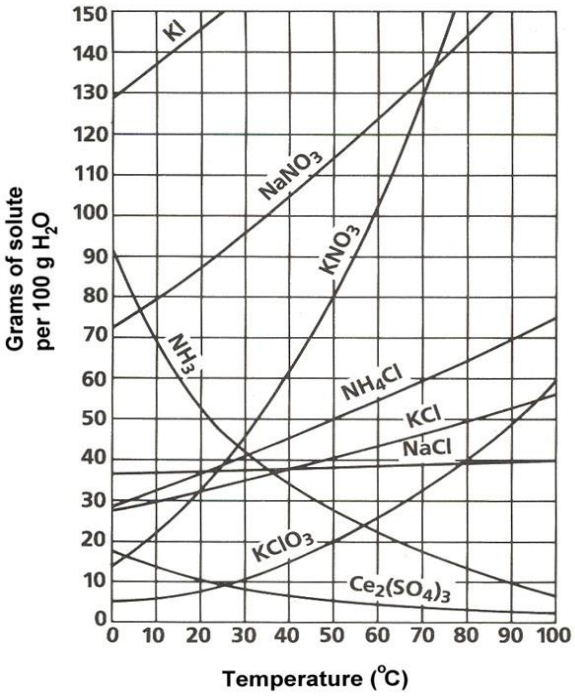
Solubility & Saturation

Name: _____

Date: _____ Per: _____

DIRECTIONS: Use the Solubility Curve to answer the following questions. REMEMBER UNITS!

1. Points on a solubility curve, like the one shown at right, represent the concentration of a solution at a particular temperature. The points on the line for each solute indicate the maximum amount of solute that will dissolve at that specific temperature. This is a(n) _____ solution. If the concentration of a solution falls above the line for a solute at a specific temperature, the solution is a(n) _____ solution. On the other hand, if the concentration of a solution falls below the line for a solute indicate at a specific temperature, the solution is a(n) _____ solution.



2. What mass of solute will dissolve in 100 g of water at the following temperatures?
   a. KNO_3 at 70°C = _____.
   b. NaCl at 100°C = _____.
   c. NH_4Cl at 90°C = _____.

3. Which of the **above** three substances is most soluble in water at 15°C. = _____.

4. At 30°C approximately 10g of $KClO_3$ will dissolve in 100g of water. If the temperature is increased to 80°C, approximately _____ more grams of $KClO_3$ will dissolve.

5. At 40°C approximately 60g of KNO_3 will dissolve in 100g of water. If the temperature is decreased to 10°C, approximately grams of KNO_3 will precipitate out? _____

Concentration of Solution	**Saturated, Unsaturated or Supersaturated?**	**If unsaturated: How much more solute can dissolve in the solution? If supersaturated: How much solute remains "undissolved"?**
70g of $NaNO_3$ at 60°C in 100 g H_2O		
70g of $NaNO_3$ at 30°C in 100 g H_2O		
50g of NH_4Cl at 30°C in 100 g H_2O		
50g of NH_4Cl at 60°C in 100 g H_2O		
20g of $KClO_3$ at 50°C in 100 g H_2O		
20g of $KClO_3$ at 50°C in 50 g H_2O		
70g of NH_3 at 0.0°C in 100 g H_2O		
70g of NH_3 at 40°C in 100 g H_2O		