

**CHE 112 - Homework - Ch 12b**  
**Solubility**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Define the terms (1) Unsaturated, (2) Saturated, and (3) Supersaturated. Draw a Solubility Diagram illustrating the terms.

2. In a saturated solution containing undissolved solute, the solute is continuously dissolving, but the concentration of the solution remains unchanged. Explain how this can occur.

3. Answering the following questions using the table below:

Temperature (°C)	0.0	10.	20.	30.	40.	50.	60.	70.	80.	90.	100.
Solubility (g KBr/100g H <sub>2</sub> O)	53.5	59.5	65.2	70.6	75.5	80.2	85.5	90.0	95.0	99.2	104

(a) By interpolating between the points, what is the solubility of KBr at 33 °C? Explain. 3(a) \_\_\_\_\_

(b) Make a graph of the data above and attach it to the back of the HW. Using the graph, estimate the solubility of KBr at 65 °C. Explain. 3(b) \_\_\_\_\_

(c) In the space below write the equation of a line that best describes solubility as a function of temperature. Using the equation, what is the solubility of KBr at 120 °C? 3(c) \_\_\_\_\_

**CHE 112 - Homework - Ch 12b**  
**Solubility**

4. Answer the following questions using the graph given in class:

(a) Is a solution consisting of 30.0 grams of  $\text{CuSO}_4$  in 100 mL of water (U)nsaturated, (S)aturated or (SS)upersaturated at 30.°C? Explain. 4(a) \_\_\_\_\_

(b) Is a solution consisting of 12.0 grams of  $\text{KClO}_3$  in 65 mL of water (U)nsaturated, (S)aturated or (SS)upersaturated at 40.°C? Explain. 4(b) \_\_\_\_\_

(c) If you start with a saturated solution of  $\text{KClO}_3$  at 80°C, and cool it to 20°C, how many grams of  $\text{KClO}_3$  will precipitate out? Explain. 4(c) \_\_\_\_\_

(d) How many more grams of  $\text{NH}_4\text{Cl}$  can be added to a solution consisting of 55.0 grams of  $\text{NH}_4\text{Cl}$  dissolved in 175 mL of water at 70.°C? Explain. 4(d) \_\_\_\_\_

**CHE 112 - Homework - Ch 12b**  
**Solubility**

5. Answer the following questions about the effects of temperature and pressure on solubility:

(a) As temperature increases the solubility of solids in liquids (I)ncreases, (D)ecreases or (S)tays the same? Explain. 5(a) \_\_\_\_\_

(b) As temperature increases the solubility of gasses in liquids (I)ncreases, (D)ecreases or (S)tays the same? Explain. 5(b) \_\_\_\_\_

(c) As pressure increases the solubility of solids in liquids (I)ncreases, (D)ecreases or (S)tays the same? Explain. 5(c) \_\_\_\_\_

(d) As pressure increases the solubility of gasses in liquids (I)ncreases, (D)ecreases or (S)tays the same? Explain. 5(d) \_\_\_\_\_

6. List and briefly explain, the 4 things that affect the rate at which a solid will dissolve in a liquid.

7. Hydrogen sulfide ( $\text{H}_2\text{S}$ ) is a toxic gas responsible for the odor of rotten eggs. The solubility of  $\text{H}_2\text{S}(\text{g})$  in water at STP is 0.195 M. What is the Henry's-law constant of  $\text{H}_2\text{S}$  at  $0^\circ\text{C}$ ? What is the solubility of  $\text{H}_2\text{S}$  in water at  $0^\circ\text{C}$  and a partial pressure of 25.5 mm Hg?

**CHE 112 - Homework - Ch 12b**  
**Solubility**