

Name: _____

Date: _____

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

[3 pt] 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.

[9 pt] 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 ₂ 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) _____

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[12 pt] 4. Answer the following questions using the graph given in class or the solubility table on your Cheat Sheet:

(a) Is a solution consisting of 30.0 grams of 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 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 KClO_3 at 80°C, and cool it to 20°C, how many grams of KClO_3 will precipitate out? Explain. 4(c) _____

(d) How many more grams of NH_4Cl can be added to a solution consisting of 55.0 grams of NH_4Cl dissolved in 175 mL of water at 70.°C? Explain. 4(d) _____

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- [12 pt] 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, 5(a) _____
(D)ecreases or (S)tays the same? Explain.

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

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

 - (d) As pressure increases the solubility of gasses in liquids (I)ncreases, 5(d) _____
(D)ecreases or (S)tays the same? Explain.
- [8 pt] 6. List and briefly explain, the 4 things that affect the rate at which a solid will dissolve in a liquid.
- [3 pt] 7. Hydrogen sulfide (H_2S) 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 H_2S at 0°C ? What is the solubility of H_2S in water at 0°C and a partial pressure of 25.5 mm Hg?