Solutions Worksheet

Solubility Curves

1. Which salt is least soluble in water at 20°C?
2. How many grams of potassium chloride can be dissolved in 200g of water at 80°C?
3. At 40°C, how much potassium nitrate can be dissolved in 300g of water?
4. Which salt shows the least change in solubility from 0°- 100°C?
5. At 30°C, 90g of sodium nitrate is dissolved in 100g of water. Is this solution saturated, unsaturated or supersaturated?
6. A saturated solution of potassium chlorate is formed from 100 g of water. If the saturated solution is cooled from 80°C to 50°C, how many grams of precipitate are formed?
7. What compounds show a decrease in solubility from 0°C to 100°C?
8. What salt is most soluble at 10°C?
9. Which salt is least soluble at 50°C?
10. Which salt is least soluble at 90°C
11. What relationship exists between solubility and temperature for most of the substances shown?
12. What is the exception? What accounts for this exception?
13. Approximately how many grams of $NaNO_3$ will dissolve in 100g of water at 20°C?
14. Approximately how many grams of $NaNO_3$ will dissolve in 100g of water at 60°C?
15. How many grams of NH_4Cl will dissolve in 1 liter of H_2O at 50°C?
16. 90.0g of $NaNO_3$ is added to 100g of H_2O at 0°C. With constant stirring, to what temperature must the solution be raised to produce a saturated solution with no solid $NaNO_3$ remaining?
17. A saturated solution of $KClO_3$ was made with 300g of H_2O at 40°C. How much $KClO_3$ could be recovered by evaporating the solution to dryness?
18. 500.0g of water is used to make a saturated solution of KCl at 10°C. How many more grams of KCl could be dissolved if the temperature were raised to 100°C?
19. A saturated solution of KNO_3 in 200g of H_2O at 50°C is cooled to 20°C. How much KNO_3 will precipitate out of solution?

Molarity

1. What is the molarity of a solution in which 58g of NaCl are dissolved in 1.0L of solution?
2. What is the molarity of a solution in which 10.0g of $AgNO_3$ is dissolved in 500.mL of solution?
3. How many grams of KNO_3 should be used to prepare 2.00L of a 0.500M solution?
4. To what volume should 5.0g of KCl be diluted in order to prepare a 0.25M solution?
5. How many grams of $CuSO_4 \cdot 5H_2O$ are needed to prepare 100.mL of a 0.10M solution?

Molality

1. What is the molality of a solution in which 3.0 moles of NaCl is dissolved in 1.5Kg of water?
2. What is the molality of a solution in which 25g of NaCl is dissolved in 2.0Kg of water?
3. What is the molality of a solution in which 15g of I_2 is dissolved in 500g of alcohol?
4. How many grams of I_2 should be added to 750g of CCl_4 to prepare a 0.020m solution?
5. How much water should be added to 5.00g of KCl to prepare a 0.500m solution?

Colligative Properties - BP Elevation & FP Depression

1. What is the new boiling point of 25g of NaCl is dissolved in 1.0Kg of water?
2. What is the freezing point of the solution in problem 1?
3. What are new freezing and poiling points of water if 50.0g of ethylene glycol MM=62g/mol) is added to 50.0g of water?
4. When 5.0g of a nonelectrolyte is added to 25g of water, the new freezing point is -2.5°C. what is the molecular mass of the unknown compound?