Solutions Worksheet Answers

1. Define the following terms:

    a. Solubility: Degree to which a given solute dissolves in a particular solvent

    b. Supersaturated: Solution where the amount of solute dissolved exceeds solubility

2. Give the equations for:

    a. Molarity: mol solute/L solution

    b. Molality: mol solute/kg solvent

    c. Weight Percent: grams solute/grams solution * 100%

3. You have 2 moles of NaCl. You dissolve it in 3 liters of water. What is the molarity?

    Molarity = mol solute/L solution

    2 mol NaCl/3L H_2O = .66 M

4. You have 100 g of NaCl. You dissolve it in 3 liters of water. What is the molarity?

    Molarity = mol solute/L solution

    100 g NaCl * 1 mol NaCl/58.44 g NaCl = 1.7 mol NaCl

    1.7 mol NaCl/3L H_2O = .57 M

5. A solution is prepared by dissolving 22.7 g NaCN in enough water to make 250 mL of solution. What is the molarity?

    Molarity = mol solute/L solution

    22.7 g NaCN * 1 mol NaCN/49.01 g NaCN = .463 mol NaCN

    .463 mol NaCN/0.25L solution= 1.85 M

6. You have 3 moles of NaCl. You dissolve it in 6 kg of water. What is the molality?

    Molality=mol solute/kg solvent

    3 mol NaCl/6 kg H_2O = .5 m

7. Describe how to prepare 400 grams of a 15% (mass/mass) aqueous solution of KBr.

    We need to find out how many grams of KBr to dissolve in 400 g of water.

    Weight Percent = .15 = X g KBr/400g   .15 * 400 g = X g KBr   X = 60 g KBr

    Mix 60 g KBr with 340 g H_2O to make a 15% aqueous solution of KBr.

8. 150 mL of 0.05 M HCl is diluted to 750 mL. What is the new molarity?

$M_1v_1 = M_2v_2$

(.05 M)(150 mL) = (M_2)(750 mL)

M_2 = .01 M

9. Describe how to prepare 500 mL of 0.25 M KCl.

We need to find out how many grams of KCl to dissolve in 500 mL (.5 L) of water.

.25 M = X mol KCl/0.5 L H_2O X= 0.125 mol KCl

0.125 mol KCl * 74.55g KCl/1 mol KCl = 9.32 g KCl

Mix 9.32 g KCl with 500 mL H_2O to make a 0.25 M solution of KCl.

10. A solution of 0.25 M NaOH is used to prepare 0.1 M NaOH. How much of the 0.25 M solution is needed to prepare 500 mL of the diluted NaOH?

$M_1v_1 = M_2v_2$

(.25 M)(v_1) = (0.1 M)(500 mL)

v_1 = 200 mL

11. Two sealed soda pop cans contain a soft drink under pressure. One of the cans is placed in the refrigerator at 5°C. The other can is placed on the outdoor table at 32°C. After two hours, both of the cans are opened. Which one is more likely to have foam from the soft drink spill out? Explain your answer.

The warmer can of soda will create more foam because the gas (CO2) is less soluble at higher temperatures. This means that more gas will come out of solution, creating more foam.