WLHS / Chem / Monson

Name_____
Date_____Per_____

PROBLEM SET: SOLUBILITY CURVES

See solubility curves on graph on reverse side.

1) Most substances on this graph show increased solubility as temperature increases. What are the exceptions?

2) Each curve shows how the solubility for that substance changes as_____ changes.

3) (circle answer) The solubilities of substances whose curve shows greater (steeper) slopes are **(MORE / LESS)** affected by temperature changes than those that have more gradual slopes.

4) If 50 cm^3 of water saturated with potassium chlorate ($KClO_3$) at 23ºC is slowly evaporated to dryness, how many grams of the dry salt ($KClO_3$) will be recovered?

5) What is the smallest volume of water required to dissolve completely 23 g of NH_4Cl at 40ºC?

6) A saturated solution of $NaNO_3$ in 100cm^3 of water at 40ºC is heated to 50°C. What is the rate of increase in solubility in grams per degree (in other words, for every degree of temp. increase, how many more grams dissolve)?

7) Which salt has solubility values that are **LEAST** affected by changes in temperature?

8) If 30g of KCl is dissolved in 100 cm^3 of water at 45ºC, how many additional grams of KCl would be needed to make the solution saturated at 80ºC?

9) At what temperature do potassium chlorate ($KClO_3$) and potassium chloride (KCl) have the same solubility in water?

10) At 50ºC, 100 cm^3 of water is **SATURATED** with cerium sulfate($Ce_2(SO_4)_3$). How many grams of cerium sulfate must be added to saturate the solution at 0ºC? (HINT: first determine how many grams were already in the original saturated solution)

11) At 50ºC, 100 cm^3 of water is saturated with potassium nitrate (KNO_3). How many grams of potassium nitrate will precipitate when the solution is cooled to 40ºC?

12) How many grams of sodium chloride (NaCl) are required to saturate 500 cm^3 of water at 100ºC?

13) Which compound is **LEAST** soluble in water at 12ºC?

14) At 80ºC, 100cm^3 of water is saturated with KCl. How many grams of KCl will precipitate when the solution is cooled to 45ºC?

15) A saturated solution of which compound contains 130 g of solute per 100 cm^3 of water at 70ºC?

16) How many grams of $NaNO_3$ are required to saturate 200 cm^3 of water at 10ºC?

17) Which saturated solution of a chloride (~Cl) has the greatest percentage by mass of solute at 60ºC?

18) A saturated solution of KNO_3 was made with 300 cm^3 of water at 70ºC. How much KNO_3 could be recovered by evaporating the solution to dryness?

19) 500 cm^3 of water are used to make a saturated solution of KCl at 10ºC. How many more grams of KCl could be dissolved if the temperature were raised to 80ºC?

20) How many grams of NH_4Cl will dissolve in a 200,000 liter tub of water at 70ºC?

SOLUBILITY CURVES FOR A NUMBER OF WATER SOLUBLE INORGANIC SUBSTANCES