

Name: \_\_\_\_\_ Due Date: \_\_\_\_\_

HONORS CHEM: SOLUTIONS REVIEW PACKET

- A solution is best described as a
  - heterogeneous mixture
  - homogeneous mixture
  - compound
  - element
- A change in pressure will have the greatest influence on the solubility of a
  - solid in a liquid
  - liquid in a gas
  - gas in a liquid
  - liquid in a solid
- As temperature increases, the solubility of solid calcium chloride in water
  - increases
  - decreases
  - remains the same
- Based on the *Solubility Guidelines* chemistry reference table, which compound is insoluble?
  - barium sulfate
  - sodium sulfate
  - potassium sulfate
  - lithium sulfate
- Compounds containing the chloride ion ( $\text{Cl}^-$ ) are insoluble when combined with
  - magnesium ( $\text{Mg}^{2+}$ )
  - silver ( $\text{Ag}^+$ )
  - sodium ( $\text{Na}^+$ )
  - calcium ( $\text{Ca}^{2+}$ )
- According to the *Solubility Curves* chemistry reference table, what is the maximum number of grams of  $\text{NH}_4\text{Cl}$  that will dissolve in 200g of water at  $70^\circ\text{C}$ ?
  - 62 g
  - 124 g
  - 100 g
  - 85 g
- According to the *Solubility Curves* chemistry reference table, the solubility of which compound decreases most rapidly as the temperature changes from  $10^\circ\text{C}$  to  $70^\circ\text{C}$ ?
  - KCl
  - $\text{NH}_4\text{Cl}$
  - HCl
  - $\text{NH}_3$
- Which solution contains the greatest number of moles of solute?
  - 2 L of a 2 M solution
  - 0.5 L of a 2 M solution
  - 0.5 L of a 0.5 M solution
  - 2 L of a 0.5 M solution
- How many grams of KOH are needed to prepare 250 ML of a 2.00 M solution of KOH? (gram formula mass = 56.0 g/mol)
  - 112 g
  - 2.00 g
  - 1.00 g
  - 28.0 g

10. How many grams of KI are needed to prepare 2,000 g of an aqueous solution containing 25 parts per million (ppm) of solute?

a.  $5.0 \times 10^4$  g

b. 0.0125 g

c. 0.050 g

d.  $1.25 \times 10^4$  g

11. A solution is made by dissolving an electrolyte in water. The solution conducts electricity as a result of the presence of

a. atoms

b. ions

c. molecules

d. compounds

12. Which solution has the highest boiling point?

a. 1 mole of  $\text{NaNO}_3$  in 750 g of water

b. 1 mole of  $\text{NaNO}_3$  in 1000 g of water

c. 1 mole of  $\text{NaNO}_3$  in 250 g of water

d. 1 mole of  $\text{NaNO}_3$  in 500 g of water

13. What factors determine the degree of solubility of a substance in a solution?

Solids~

Gases~

14. Identify three ways to increase the rate of solution for:

Solid solutes~

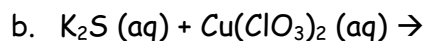
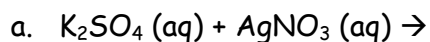
Gaseous solutes~

15. Explain the saying "like dissolves like" and its relevance to solution formation.

16. Identify if each of the following ionic substances is soluble or insoluble in water.

- a.  $\text{Na}_2\text{CO}_3$  \_\_\_\_\_
- b.  $\text{CaSO}_4$  \_\_\_\_\_
- c. ammonium nitrate \_\_\_\_\_
- d. copper (II) bromide \_\_\_\_\_

17. Determine the products for each of the following double replacement reactions. Identify the insoluble product (if any).



18. Identify the substance that creates a saturated solution under the listed conditions.

- a. 5 g solute in 100 g solvent at  $50^\circ\text{C}$  \_\_\_\_\_
- b. 140 g solute in 200 g solvent at  $23^\circ\text{C}$  \_\_\_\_\_
- c. 55 g solute in 50 g solvent at  $45^\circ\text{C}$  \_\_\_\_\_

19. Identify if each of the following represents an unsaturated, saturated or supersaturated solution.

- a. 45 g KCl in 100g  $\text{H}_2\text{O}$  at  $60^\circ\text{C}$  \_\_\_\_\_
- b. 70 g KI in 50 g  $\text{H}_2\text{O}$  at  $10^\circ\text{C}$  \_\_\_\_\_
- c. 80 g NaCl in 200 g  $\text{H}_2\text{O}$  at  $90^\circ\text{C}$  \_\_\_\_\_

20. If 100 g of KI is dissolved in 100 g water at  $20^\circ\text{C}$ , how much more KI must be added to saturate the solution at that temperature?

21. A saturated solution of  $\text{KNO}_3$  is cooled from  $60^\circ\text{C}$  to  $50^\circ\text{C}$ , how much  $\text{KNO}_3$  precipitated from the solution?

22. Determine the molarity of a solution that contains 47.8 g  $\text{Na}_2\text{CO}_3$  dissolved in water to make a 7.5 L solution.

23. What volume is needed to make a 2.0 M solution of  $\text{Li}_2\text{SO}_3$  if 1.25 moles of solute is used?

24. What is the percent mass of a solution that contains 28 g KBr in 250 g of water?

25. A 13 g sample of water contains  $4.5 \times 10^{-4}$  g of fluoride ions. What is the concentration of fluoride ions in parts per million?

26. What mass of NaOH is dissolved in 560 g of a 22% NaOH solution?

27. How many grams of  $\text{Pb}(\text{NO}_3)_2$  are needed to make 500.0 mL of a 0.25 M solution?

28. What is the percent by volume of a solution that contains 45.0 mL of acetone dissolved in 75.0 mL of cyclohexane?

29. What is the concentration of a solution in parts per million if the solution is 1.15% solute by mass?

30. Calculate the new boiling point of a solution in which 234.5 g  $\text{Na}_3\text{PO}_4$  are dissolved in 600. g water?

Assessment  
II

Assessment II

31. Calculate the new freezing point if 78.0 g  $C_2H_5OH$ , a nonelectrolyte is dissolved in 500.0 g of benzene. (For Benzene:  $k_{fp} = 5.12^\circ C/m$  and freezing point =  $5.533^\circ C$ )

Assessment II

32. What is the vapor pressure of water at  $80^\circ C$  if 690. g of sucrose ( $C_{12}H_{22}O_{11}$ ) is dissolved in 126.0 g of water?

Assessment II

33. The solubility product constant for  $Al(OH)_3$  is  $1.26 \times 10^{-33}$ . What is the  $[OH^-]$  in the solution when it reaches equilibrium?

