Chemistry
Study Guide Ch 18

1. Solutions are _____ mixtures that may be solid, liquid, or gaseous.
2. Factors that affect the rate (speed) at which a substance dissolves are nature of _____ and _____. _____ or stirring, _____, and _____ _____.
3. _____ increase the rate of dissolving by bringing fresh solvent in contact with undissolved solute.
4. Sugar absorbs energy as it dissolves. Increasing the _____ of the solvent will increase the rate of dissolving.
5. Dissolving is a surface phenomenon. Increasing the _____ _____ of a solid increase the contact between solute and solvent resulting in an increase in the rate of dissolving .
6. In a saturated solution the rate of salvation dissolving is equal to the rate of _____ a saturated solution cannot hold anymore solute in solution at he specified temperature.
7. _____ is the amount of solute the must dissolve in a certain amount of solvent to give saturate solution at a certain temperature. The solubility of NaCl is 36.2g of NaCl per 100 g of water at 25^{o}C.
8. An _____ solution contains less solute that is need to produce a saturated solution. In an unsaturated solution the rate of dissolving is faster than the rate of crystallization. Equilibrium is not reached.
9. Two liquids are said to be _____ if they dissolve in each other in all proportions. Saturation cannot be achieved. Ethanol (the alcohol in alcoholic beverages) and water are infinitely soluble in each other.
10. Liquids that are insoluble in each other are said to be _____. Water and oil are immiscible.
11. Study Fig. 18.1 All of the solutes in the graph are solids. From the graph, the solubility of KBr at 10^{o}C is _____ g KBr/100g water and _____ g KBr?100 g water at 40^{o}. The solubility of Na_2SO_4 _____ as temperate increase. The solubility of the other solutes _____ as temperature increase. The solubility of most solid solutes increase as temperature increases.
12. Study Fig. 18.4

A) What mass of $NaNO_3$ is required to saturate 100 g of water at 10^{o}C?_____

B) What mass of $NaNO_3$ is required to saturate 200 g of water at 10^{o}C?_____

C) 160 g of KNO_3 is dissolved in 100g of water with heating. What mass of KNO_3 must crystallize from solution as the temperature of the solution is reduced to 70^{o}C?_____

13. As temperature increase the solubility of all gases _____.
14. A pot of cold water is placed on the stove and heated. After a short time you notice lots of bubbles on the inside wall of the pot. You touch the water and observe that the temperature is well below the boiling point of water. What are ht bubbles and what causes them to form as the water is heated?
15. Study the graph of p. 505. As temperature _____ solubility of all gases _____. At what temperature does the solubility of all gases reach a concentration (solubility) of zero_____. What is special about this temperate with respect to water?
16. The solubility, concentration of a gas in a liquid is also affected by _____. Gas _____ increases as the _____ _____ of the gas _____ the solution _____.
17. How do drink companies get so much carbon dioxide in a carbonated beverage?
18. Study Fig. 18.6 What happens to the solubility of CO_2 as gas when the top is removed from a carbonated beverage?
What visual evidence is there that the solubility has decreased?
19. Will a hot or cold carbonated beverage spew better? Why?
20. What are some things that can be done to keep 3L carbonated beverage from going flat as quickly?
    1.
    2.
    3.
21.Henry's Law states that solubility of a gas and pressure are _____ proportional

22. A solution that contains more dissolved solute than it should be able to hold at the specified temperature is called _____ solution.
23. A crystal solute is added to a solution. Identify the solution as saturated, unsaturated or supersaturated based on what is observed after the crystal is added to the solution.
A) the crystal changes shape over several days but the size of the crystal does not change.
B) The solution turns completely sold.
C) The crystal completely dissolves.
D) Only part of the crystal dissolves.
E) Can you explain why the crystal in A chang3ed shape but did not change in size (mass).
24. Study Fig. 18.8. What causes the mineral formations at the edge of the hot springs?
25. Study Fig. 18.9. How does seeding the clouds with silver iodide, AgI, promote formation of rain?
26. Concentration is a _____ of solute in a _____ amount of solvent.
27. A _____ solution contains more solute per unit volume than a _____ solution.
28. The most important way of expressing solution concentrations in chemistry is _____ (M).
29. Molarity, M, is equal to _____ of _____ divided by _____ of _____. What are the two parts of a solution? _____ and _____. Molarity is a ration relationship expressed in moles of solute per 1.0 L of solution just as prices at the grocery store are expressed in price per 1.0 lb.
30. A) How many moles of solute are in 1.0L of a 2.0 M solution? _____ B) How many moles of solute are in 2.0L of a 2.0 M solution? _____ C) What mass determines moles first, of NaOH is needed to make 0.50L of a 2.0 M NaOH solution _____. D) 2.0L of solution contains 80.0 NaOH. What is the molarity? _____M NaOH
31. Study Fig. 18.12. As solvent, water is added to solution one to give solution tow , he volume of the solution _____ the concentration of molarity of solute particles _____ and the number of solute particles does not change.
32. Give the equation for dilution. This equation indicates that as V_1 changes to V_2 the volume _____ and as M_1 changes to M_2 the concentration _____.During dilution moles of solute initial _____ moles of solute final
33. Work Practice Problem 12 on p. 513 a **Stock solution** is a solution that is kept in the chemical stock room and has a know concentration . M_1 = _____ M KI M_2 = _____ M KI
V_1 =_____ mlKI V_2 = _____ mL
34. Other ways of expressing concentration of solute in solvent are percent by volume, perecent (m.v), ppm, ppb, and ppt.
A) Give the equation for percent by volume
B) Give the equation for % (m/v)
C) ppm= parts per million (2.6 ppm = 2.6 g of solute in 1,000,000 g of solution)
ppb = parts per billion (5.7 ppb = 5.7 g of solute in 1.000,000,000 g of solution)
ppt = parts per trillion (25 ppt = 25 g of solute in 1,000,000,000,000 g of solution)

What do we call parts per 100?

35. Physical properties of a solution that depend only on the number of solute particles, rather than the specific identity if the solute, are called_____ _____ Three important colligative properties of solutions are
1)
2)
3)
36. Te pressure exerted by a vapor in equilibrium (rate of evaporation = rate of condensation) with its liquid is called _____ _____. Study Fig. 18.15. As solute particle are added to the solvent, the vapor pressure of the solvent _____ since there are fewer solvent molecules in the vapor phase to hit the walls of the container.
37. The decrease in vapor pressure, VP, is directly _____ to the number of particles the solute

makes in moles of each solute were added to equal volumes of water?Study Fig. 18.16. Why is the reduction in VP of hte NaCl solution twice the reduction iv VP of the glucose solution even though 3 moles of each solute were added to equal volumes of water?

How much is the VP of The $CaCL_2$ solution reduced compared to the glucose solution?

38. BP_____ is the difference in temperature between the BP of the _____ and the pure _____
39. FP _____ is the difference in temperature between the freezing point of the pure _____ and that of the solution
40. The more solute that is added to a solvent the more the VP _____ and the BP_____ and the FP _____.