Chemistry
Study Guide Ch 18

1. Solutions are **Homogeneous** mixtures that may be solid, liquid, or gaseous.
2. Factors that affect the rate (speed) at which a substance dissolves are nature of **solvent** and **solute**. **agitation** or stirring, **temperature**, and **surface area**.
3. **agitation** increase the rate of dissolving by bringing fresh solvent in contact with undissolved solute.
4. Sugar absorbs energy as it dissolves. Increasing the **temp.** of the solvent will increase the rate of dissolving.
5. Dissolving is a surface phenomenon. Increasing the **surface area** 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 **crystallization** a saturated solution cannot hold anymore solute in solution at he specified temperature.
7. **Solubility** 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 **Unsaturated** 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 **miscible** 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 **immicible**. 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 **63** g KBr/100g water and **77** g KBr?100 g water at 40^{o}. The solubility of Na_2SO_4 **down** as temperate increase. The solubility of the other solutes **up** 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? **80g** B) What mass of $NaNO_3$ is required to saturate 200 g of water at 10^{o}C? **160g** 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? **40g** **solubility = 120g/KNO_3/100g H_2O**
13. As temperature increase the solubility of all gases **50g** **100g KBr/100g H_2O**
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? **Dissolved atomspheric as temp. goes up gas solubility goes down.**
15. Study the graph of p. 505. As temperature **Increases** solubility of all gases **Decreases**. At what temperature does the solubility of all gases reach a concentration (solubility) of zero **100^{o}C**. What is special about this temperate with respect to water? **BP of Water**
16. The solubility, concentration of a gas in a liquid is also affected by **Pressure**. Gas **Solubility** increases as the **particle pressure** of the gas **above** the solution **goes up**.
17. How do drink companies get so much carbon dioxide in a carbonated beverage? **High CO_2 Pressure**
18. Study Fig. 18.6 What happens to the solubility of CO_2 as gas when the top is removed from a carbonated beverage? **Goes Down**
What visual evidence is there that the solubility has decreased? **Formation of Bubbles of CO_2**
19. Will a hot or cold carbonated beverage spew better? Why? **Hot. As temp. increases solubility decreases**
20. What are some things that can be done to keep 3L carbonated beverage from going flat as quickly?
    1. **Cool before opening**
    2. **Get the top back on quickly**
    3. **Do not agitate before opening**

21.Henry's Law states that solubility of a gas and pressure are **Directly** proportional
22. A solution that contains more dissolved solute than it should be able to hold at the specified temperature is called **Supersaturated** 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. **Saturated**
B) The solution turns completely sold. **Supersaturated**
C) The crystal completely dissolves. **Unsaturated**
D) Only part of the crystal dissolves. **Unsaturated and becomes saturated**
E) Can you explain why the crystal in A changed shape but did not change in size (mass). **Crystallization does not cocur at the same place as dissolving**
24. Study Fig. 18.8. What causes the mineral formations at the edge of the hot springs? **As saturated hot water cools due to a reduction in solubility**
25. Study Fig. 18.9. How does seeding the clouds with silver iodide, AgI, promote formation of rain? **Attracts H_2O molecules in supersaturated air mass to form droplets**
26. Concentration is a **amount** of solute in a **certain** amount of solvent.
27. A **concentrated** solution contains more solute per unit volume than a **dilute** solution.
28. The most important way of expressing solution concentrations in chemistry is **molarity** (M).
29. Molarity, M, is equal to **mole** of **solute** divided by **liters** of **solution**. What are the two parts of a solution? **Solute** and **solvent**. 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? **2 mol** B) How many moles of solute are in 2.0L of a 2.0 M solution? **4 mol** C) What mass determines moles first, of NaOH is needed to make 0.50L of a 2.0 M NaOH solution **1 mole = 40g NaOH** D) 2.0L of solution contains 80.0 NaOH. What is the molarity? **1.0** M NaOH
31. Study Fig. 18.12. As solvent, water is added to solution one to give solution tow , he volume of the solution **goes up** the concentration of molarity of solute particles **goes down** and the number of solute particles does not change. $\mathbf{M_1 X V_1 = M_2 X V_2}$
32. Give the equation for dilution. This equation indicates that as V_1 changes to V_2 the volume **goes up** and as M_1 changes to M_2 the concentration **goes down.**