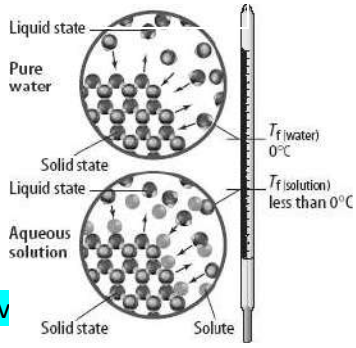
PS Chemistry Chapter 22 Review

Practice Questions

Multiple Choice: Circle the correct answer in each set.

1. Which of the following statements is true about how using smaller salt crystals would affect the rate of making a salt solution in water?
   Smaller crystals increase the surface area and slow down dissolving.
   Smaller crystals decrease the surface area and speed up dissolving.
   Smaller crystals increase the surface area and speed up dissolving.
   Smaller crystals decrease the surface area and slow down dissolving.
2. What characteristic of water makes it the universal solvent?
   Nonpolar large molecules long-chain hydrocarbon molecules polar
3. The illustration (Figure 1) indicates what effect of solutes on freezing point?
   Freezing point is lower because the freezing point of the solute is lower than that of water.
   Freezing point is lower because solute particles interfere with crystal formation.
   Freezing point is raised because solute particles aid crystal formation.
   Freezing point is raised because solute freezing point is higher than that of water.

Figure 1



4. Which of the following statements is true?
   Nonpolar solvents are useful for dissolving polar solutes.
   Polar solvents are useful for dissolving nonpolar solutes.
   Nonpolar solvents are not useful because they do not form solutions with water.
   Nonpolar solvents are useful for dissolving nonpolar solutes.
5. Which of the following is the most precise term?
   supersweet dilute concentrated 40 percent juice by v
6. Which of the following actions increases the rate of dissolving?
   decreasing the pressure decreasing the temperature stirring the solution using larger-sized crystals
7. Which of the following is a solution?
   Salt water 14K gold Carbonated water All of the above None of the above
8. In forming a water solution, what process does an ionic compound undergo?_____
   neutralization ionization dissociation displacement
9. In soda pop, the solvent would be the _____.
   carbon dioxide water sugar flavoring
10. A molecule that is positively charged on one end and negatively charged on the other end is ___.
    polar nonpolar both polar and nonpolar neither

Fill in the blank:

11. Adding a solute to a solvent *decreases or lowers* the freezing point of the solvent.
12. A solution of one solid metal in another is called a(n) *alloy*.
13. Vitamin C is a(n) *polar* compound and dissolves readily in water.
14. Substances that do not ionize in water and cannot conduct electricity are called *nonelectrolytes*.
15. The process in which water molecules draw ions away from a crystalline solid and into solution is *dissociation*.
16. A mixture that appears to have the same composition, color, and density and is mixed at the molecular level is called a(n) *homogeneous mixture*
17. *Solubility* is the maximum amount of a solute that can be dissolved in a given amount of solvent at a given temperature.
18. A solution that contains all the solute it can hold at a given temperature is *saturated* .
19. *Electrolytes* are compounds that form charged particles.
20. In lemonade, sugar is the *solute* and water is the *solvent*.
21. When a solid is being dissolved in a liquid, stirring *increases or speeds up* the dissolving process.
22. *Increasing* the surface area of a solid will increase the rate at which a solute dissolves.

23. Adding antifreeze to a car radiator increases the *boiling point* of the water in the radiator.
24. In a solution, the *solvent* does the dissolving.
25. The air that you breath is an example of a(n) *gaseous* solution. *(homogeneous would also work)*
26. Identify each of the following as polar (P), nonpolar (NP), or both (B)

NP Salad oil	*NP* Oil-based paint	*P* Water
P Vinegar	*P* Vitamin C	*B* Soa

27. What is the name of the process taking place in the diagram (Figure 2)? *dissociation*
28. What is the solvent in the diagram (Figure 2)? *water*
29. What is the solute in the diagram (Figure 2)? *NaCl*
30. Is the solute an electrolyte or nonelectrolyte? *electrolyte*
31. Will the solution conduct an electric current? *yes*

Data Table 1

Solubility of Substances in 100 grams of water at 20°C	
Barium Sulfate	0.00025 grams
Lithium Carbonate	1.3 grams
Lithium Bromide	166.0 grams
Sodium Nitrate	87.6 grams
Potassium Chloride	34.0 grams
Ammonium Chlorate	28.7 grams

32. According to the table above (Data Table 1), how would you classify each of the following solutions? (saturated, unsaturated, supersaturated)

Supersaturated A solution that contains 1.8 g of lithium carbonate in 100 grams of water at 20°C

Saturated A solution that contains 0.00025 g of barium sulfate in 100 g of water at 20°C

Unsaturated A solution that contains 25.8 g of ammonium chlorate in 100 g of water at 20°C

Unsaturated A solution that contains 86.7 g of sodium nitrate in 100 g of water at 20°

Refer to the Solubility Graph for #33-40.

33. Classify each of the following solutions (saturated, unsaturated, supersaturated) if the solute is dissolved in 100 grams of water.

unsaturated 75 g of potassium bromide at 50°C

supersaturated 40 g of NaCl if the water is 50°C

saturated 100 g of KBr if the water is 90°C

unsaturated 80 g of $NaClO_3$ if the water is 30°C

supersaturated 60 g of KNO_3 if the water is 30°C

34. Which salt is least soluble at 50°C? *NaCl*
35. Which salt is most soluble at 50°C? *$NaClO_3$*
36. At what temperature does the solubility of KNO_3 equal the solubility for the following solutions?
    - 81°C $NaClO_3$
    - 49°C KBr
    - 20°C NaCl
37. How much sodium chlorate would need to be added to 100 g of H_2O at 50°C to make a saturated solution? 123 g
38. How much potassium bromide would need to be added to 100 g of H_2O at 50°C to make a saturated solution? 79 g

39. How much sodium chloride would need to be added to 100 g of H_2O at 50°C to make a saturated solution?
34 g

40. How many additional grams of sodium chlorate would need to be added to keep the solution saturated during the indicated temperature changes?

0°C to 20°C 20 g 20°C to 60°C 40 g 80°C to 90°C 18 g

75-95 g 95-135 g 162-180 g

41. Explain in detail, how soap works (be sure to include terms from Chapter 22). *The ionic end of soap will dissolve in water and the hydrocarbon portion (nonpolar side) will dissolve in oils and dirt. The hydrocarbon side removes the dirt/oil and then the water will wash it away.*

True/False: Think about the results of Milk Kaleidoscope Lab when answering the following questions.

F 42. Milk with a higher fat content (like whole milk) is more polar that milk with a lower fat content (like 1%).

F 43. Dawn dishwashing soap is only able to dissolve polar substances.

T 44. Food coloring is more like skim milk than whole milk.

T 45. The fat in the milk is a non polar substance.

Chapter 23 Review

Sample Questions

True/False: Change the wording of the false statements to make them true.

1. False Solutions with a pH above 7 are acidic. basic
2. False Phenolphthalein turns bright pink in the presence of an acid. base
3. True Antacids work by neutralizing excess stomach acid.
4. False A reaction between an acid and a base produces water and sugar. salt
5. True In a titration, the point where the indicator changes color and stays that way is the endpoint
6. True A neutralization reaction between an acid and a base is a double replacement reaction.
7. False Acetic acid is found in the human stomach to help with digestion of food. Hydrochloric
8. False Bases are not corrosive. are
9. True An acid that only partly ionizes in solution is a weak acid.
10. True Human blood has a neutral pH.

Multiple Choice:

11. Which of the following statements about acids is NOT true?
    - Acids form hydroxide ions in solution.
    - Many foods contain acids.
    - Acids taste sour.
    - Acids are corrosive
12. Pure water has a pH of _____.
    - 0
    - 5.2
    - 7
    - 14
13. Which of the following statements about bases is NOT true?
    - Bases in solution feel slippery.
    - Bases form hydroxide ions in solution.
    - Bases form when acids react with metals.
    - Pure, undissolved bases are often crystalline solids.
14. Sodium hydroxide and calcium hydroxide are _____.
    - Salts
    - bases
    - phosphates
    - indicators
15. The pH scale is from:
    - 0-7
    - 1-10
    - 0-10
    - 7-20
    - none of these
16. A solution has a pH of 5. It is
    - acidic
    - basic
    - neutral
    - not possible

17. Which of the following substances contains a base?
    Aspirin
    vinegar
    fertilizer
    lemon juice
18. Colored solutions used to find pH are:
    indicators weak acids fruit extracts vegetable extract all of these
19. Which of the following statements is true concerning acids and bases?
    acids and bases don't react with each other
    acids mixed with bases neutralize each other
    acids mixed with bases make stronger bases
    acids mixed with bases make stronger acids
20. The hydronium ion is a
    H^+ OH^- H_3O^- H_2O none of these H_3O^+
21. When bases ionize they release
    hydrogen ions sodium ions chloride ions hydroxide ions
22. A common substance that contains acetic acid is
    vinegar ammonia water salad oil soap
23. Acid-base reactions are usually _____ reactions.
    Synthesis combustion decomposition double-displacement
24. The sour taste of lemons and limes is due to a substance called
    acetic acid citric acid hydrochloric acid carbonic acid
25. A(n) _____ is a substance that produces hydrogen ions in solution.
    Salt base indicator acid
26. The curve (right) shows the titration of an acid solution with a strong base solution. How many drops were required to react with all of the acid in the solution?
    50 48 75 100

Identify each of the following as A) acid B) base or C) could be an acid or a base

27. A Sour Taste
28. B Slippery
29. A Produces hydrogen ions
30. C Is corrosive (strong)
31. B Bitter taste
32. A Gastric juices in stomach
33. B Used in soap
34. C Can cause skin burns
35. B produces hydroxide ions
36. A HCl is a common example

$Ca(OH)_2 + H_2CO_3 \longrightarrow CaCO_3 + 2\ H_2O$

37. Which substance is a base? How do you know?
    $Ca(OH)_2$, the hydroxide in the compound indicates that it is a base
38. In the equation above, which substance is a salt?
    $CaCO_3$
39. What factor determines the strength of an acid or a base?
    An acid is stronger if all or nearly all of the acid molecules (H^+) dissociate into ions.
    A base is stronger if all or nearly all of the base molecules (OH^-) dissociate into ions.
40. What is a neutralization reaction? Neutralization is a chemical reaction that takes place between an acid and a base. The H+ ions from the acid combine with the OH- ions from the base to form neutral water. The remaining atoms combine to form a salt (also neutral).
    Example: $HCl + NaOH \longrightarrow H_2O + NaCl$