

# FPS - Solutions Chapter 8 - Unit 12 Review

Name \_\_\_\_\_ Period \_\_\_\_\_

## A. Definitions

1. Give the definition for the following terms:

- a. Heterogeneous mixture  
mixture with particles that are unevenly distributed
- b. Suspension  
heterogeneous mixture with large particles that separates into layers
- c. Colloid  
heterogeneous mixture with varying size of particles unevenly distributed that does NOT separate over time. Also demonstrates the Tyndall effect
- d. Homogeneous mixture  
Mixture with evenly distributed particles
- e. Solution  
Homogeneous mixture with completely uniform distribution
- f. Immiscible  
describes liquids that do not mix
- g. Miscible  
liquids that mix
- h. Solute  
substance in a mixture that is dissolved by another substance
- i. Solvent  
substance in a mixture that dissolves the solute - typically water
- j. Solubility  
ability to dissolve at a given temperature and pressure
- k. Dilute  
solution with less solute - more water (solvent) can be added to dilute a solution
- l. Concentrated  
solution with lots of solute - "strong"
- m. Unsaturated  
solution that has less than maximum solute. More can be dissolved
- n. Saturated  
Solution that contains the maximum solute - no more can be dissolved at that temperature
- o. Supersaturated  
solution that contains MORE than the maximum of solute - not possible for all substances
- p. Acid  
solution that contains more  $H^+$  ions than pure water and have a pH of 0-6.9
- q. Base  
solution that contains less  $H^+$  ions (but more  $OH^-$ ) than pure water and have a pH of 7.1-14
- r. pH scale  
scale that measures acidity/alkalinity by amount of  $H^+$

2. Describe the differences between suspensions, colloids, and solutions.

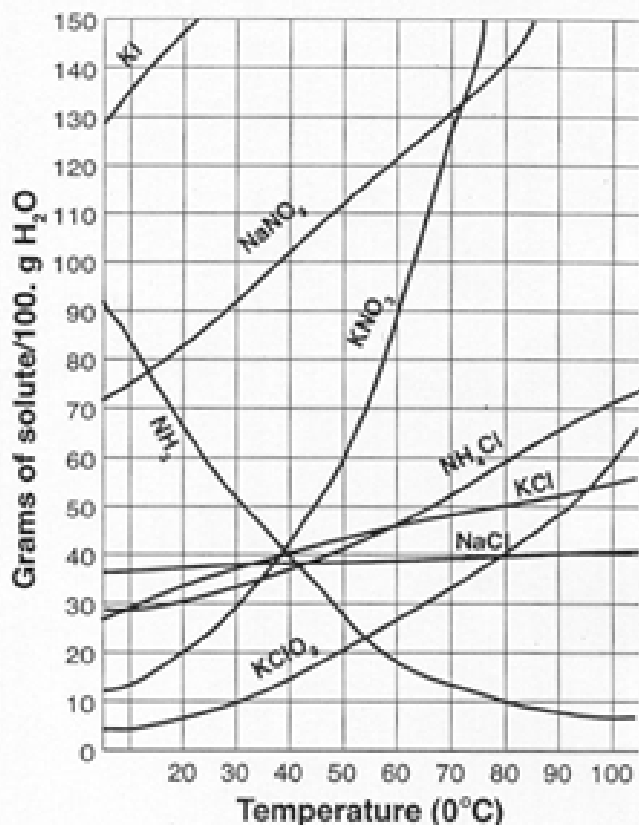
Suspensions have large particles and separate while colloids do not separate - solutions are homogeneous with a completely even distribution of particles

3. What does the phrase "like dissolves like" mean?  
Substances that are polar (charged) dissolve other polar substances, while nonpolar substances (that are not charged) dissolve other nonpolar substances. Polar and nonpolar substances cannot dissolve each other.
  4. What are 5 factors that affect solubility?  
Temperature, surface area, structure of substances, agitation, pressure
  5. Give several properties of acids.  
Taste sour, corrosive, react with metals, turn papers red, conduct electricity, neutralizes with bases, ionize in water
  6. What ions and range of pH are associated with acids?  
pH of 0-6.9, excess of  $H^+$
  7. What are some examples of common acids?  
Citric acid, vitamin C, vinegar (acetic acid), soda pop
  8. Give several properties of bases.  
Taste bitter, corrosive, does NOT react with metals, turn papers blue, conduct electricity, neutralizes with acids, removes dirt/oil
  9. What ions and range of pH is associated with bases?  
pH of 7.1-14, excess of  $OH^-$
  10. What are some examples of common bases?  
lots of cleaning products, ammonia, soap, chalk, baking soda, blood
  11. In terms of pH, what is the difference between weak acids/bases and strong acids/bases?  
The farther from 7, the stronger the acid or base. Acids with a lower pH are stronger, bases with a higher pH are stronger. Weaker acids and bases are near 7 and therefore closer to neutral.
  12. What occurs when an acid and base react?  
Neutralization - they produce water and an ionic salt
  13. In the lab, describe 3 different indicators that can be used to test acids and bases.  
Blue litmus paper, red litmus paper, pH paper or meter
  14. For red/blue litmus testing, which colors indicated acids and which colors indicate bases?  
Acids = red  
Bases = Blue
  15. What are some issues with litmus and pH paper testing?  
Color can be interpreted by different people's vision, some substances with their own color can compromise data, some substances with bleaching properties can compromise the papers
- B. *Application*
16. Hydrochloric acid has a pH of 1 and citric acid has a pH of 2. Which is a stronger acid? WHY??  
Hydrochloric acid is stronger, because it has a lower pH. Solutions with a lower pH are further from 7, but also have a high  $H^+$  concentration as well.

17. Referring to #16 – which acid has a higher concentration of  $H^+$  ions?  
 Hydrochloric acid
18. Sodium hydroxide has a pH of 13 and baking soda has a pH of 9. Which is a stronger base?  
 WHY?? Sodium hydroxide is stronger, because it has a higher pH. Solutions with a lower pH are further from 7, but also have a lower  $H^+$  concentration as well.
19. Referring to #18 – which base has a higher concentration of  $H^+$  ions? Baking soda has a HIGHER  $H^+$  concentration, but Sodium hydroxide has a higher  $OH^-$  concentration
20. You use the red/blue litmus paper test on an unknown substance, but you only have blue paper left. The substance turns the paper blue, so you tell your partner it is a base. Are you correct or incorrect? WHY? You could be correct, but you can't be sure. Neutral solutions also keep the blue litmus blue. You need more data – a red litmus paper test would help. If the red paper turns blue, you know for sure it is a base.

Use the graph to answer the questions.

## Solubility Curve



- Which salt is most soluble in water at 60°C? \_\_\_\_\_
- Which salt shows the least increase in solubility from 0-60°C? \_\_\_\_\_
- At 50°C, 40 g of KCl is dissolved in 100 g of water. Is the solution saturated, unsaturated or supersaturated?  
 \_\_\_\_\_
- Which is the least soluble salt at 20°C?  
 \_\_\_\_\_
- What is the solubility of KCl at 20°C?  
 \_\_\_\_\_
- What is the temperature at which KNO<sub>3</sub> has a solubility of 20g/100g of water? \_\_\_\_\_

1. NaNO<sub>3</sub> 2. NaCl (although NH<sub>3</sub> decreases) 3. Unsaturated 4. KClO<sub>3</sub> 5. ~35g 6. 20°C