Chemistry 20 - Unit 2 - Introduction to Solutions

Name: _____

1. What is a mixture? List and describe four different types of mixtures. Be sure to use the terms heterogeneous and homogeneous in your answer.

A mixture is when two different materials are combined together. If only one substance is visible then you will have a homogenous mixture, mainly a solution (will generally be clear and made of two liquids). If more than two substances are visible then you will have a heterogenous mixture. Heterogenous mixtures come in three types: Mechanical (if given enough time you can separate the materials by hand, generally two different solids), Suspension - large particles floating in a liquid (can be separated with a sieve, generally a “large” solid and a liquid), or colloid - small particles floating in a liquid (resists filtration, generally a “fine” solid and a liquid)

2. All solutions are made from two components. What are these two components?

Solvent - surrounds the solute (does the “dissolving”)
Solute - substance that gets dissolved

The solute will generally be less than the solvent.

3. All solutions can be classified as either electrolytes or nonelectrolytes. What are the key differences between an electrolyte and a nonelectrolyte? Give an example of each.

Electrolytes are compounds that when dissolved in water will allow electricity to flow, all ionic compounds, acids and bases are electrolytes. NaCl, $CaCl_2$ etc

Non-electrolytes are compounds that when dissolved in water will not allow electricity to flow, or at least not help. Neutral covalent compounds are non-electrolytes (Sugar, ethanol)

4. All electrolytes can be described as being acidic, basic, or neutral. Using the pH scale, explain the key differences between each of these.

pH scale is the concentration of hydrogen ions in a given solution. If pH is low then there is a lot of hydrogen ions per unit of solution. If pH is 7 then there is a “normal” amount of hydrogen ions in the given solution. If pH is high then there is a low amount of hydrogen ions in the given solution.

5. Classify each of the following mixtures as either heterogeneous or homogeneous. Justify your answers.

a. Orange juice

Heterogenous (pulp and can be filtered)

b. White vinegar

Homogenous (can't be filtered and clear)

c. Milk

Heterogeneous (fat globs floating in water and can be mechanically separated (shaken/centrifuge)))

d. Road gravel

Heterogenous (sand/rocks and can be mechanically separated, by hand)

e. Swimming pool water

Homogenous (can't be filtered and clear)

f. A mud puddle

Heterogenous (dirt/water and can be filtered)

6. Which of the following substances are solutions?

a. Milk **NO (colloid)**

b. Pop **YES (sugar and water)**

c. Pure water **NO (Only ONE thing H_2O)**

d. Lake water **YES (acid/minerals and water)**

e. Rainwater **YES (acid/minerals and water)**

7. Classify each of the following compounds as an electrolyte or a nonelectrolyte when dissolved in water.

a. Sodium fluoride (a component of toothpaste).

Electrolyte - $NaF \rightarrow Na^+_{(aq)} + F^-_{(aq)}$

b. Sucrose (table sugar).

Nonelectrolyte - doesn't make ions, neutral

c. Calcium chloride (road salt).

Electrolyte - $CaCl_2 \rightarrow Ca^{2+}_{(aq)} + 2Cl^-_{(aq)}$

d. Ethanol (a component of wine).

Nonelectrolyte - doesn't make ions, neutral