**Unit 6: Solutions, Acids and Bases Study Guide**

SC7. Students will characterize the properties that describe solutions and the nature of acids and bases.

Explain the process of dissolving in terms of solute/solvent interactions:

• Observe factors that effect the rate at which a solute dissolves in a specific solvent,

• Express concentrations as molarities,

• Prepare and properly label solutions of specified molar concentration,

• Relate molality to colligative properties.

b. Compare, contrast, and evaluate the nature of acids and bases:

• Arrhenius, Bronsted-Lowry Acid/Bases

• Strong vs. weak acids/bases in terms of percent dissociation

• Hydronium ion concentration

• pH

• Acid-Base neutralization

1. Define the following

insoluble

electrolyte

nonelectrolyte

saturated

emulsion

solution,

miscible

solvent

solute

ionization

salvation

crystallization

solvation

dilute

dissolved

concentrated

Molarity

Molality

pH

Neutralization

1. Give an example of a solid-in-solid solution:
2. A 6.05 -g sample of a nonelectrolyte is dissolved in 200 g of water. The solution freezes at -2.53°C. Calculate the molar mass of the solute. Kf for water = 1.86°C/m.

1. What will increase the rate of solvation?
2. What information does a solubility curve graph tell you?
3. The partial pressure of CO2 inside a bottle of soft drink is 2.0 atm at 25oC. The solubility of CO2 is 0.05 mol/L. When the bottle is opened, the partial pressure drops to 2.5 x 10-2 atm. What is the solubility (in mol/L) of CO2 in the open drink?
4. What is the molarity of an aqueous solution that contains 5.0g of sucrose, C12H22O11, in 4.2 mL of solution?
5. What is the difference between molarity and molality?
6. What volume of 5.6M HCl must be added to sufficient water to prepare 2.00 liters of 1.00M HCl?

1. What are the four colligative properties? Explain each one.

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1. Calculate the freezing point of a solution that contains 3.0 g of sucrose (C12H22O11) in 50 g of H2O. Kf for H2O = 1.86°C/m
2. If 2.50 g sucrose (C12H22O11) are dissolved in 10.2 g water, what is the boiling point of the resulting solution? Kb for water = 0.512°C/m.

1. Compare acids and bases
2. What is a Arrhenius,
3. What is Bronsted-Lowry Acid/Bases
4. Identify a conjugate acid-base pair in the reaction: NH3 + H2O ‹–› NH4+ + OH-

1. Compared to strong acids, weak acids produce \_\_\_\_\_\_\_\_\_\_ ions and conduct electricity \_\_\_\_\_\_\_\_\_\_ efficiently.

1. The acid ionization constant, Ka, is \_\_\_\_\_\_\_\_\_\_ for \_\_\_\_\_\_\_\_\_\_ acids.

1. A 0.001M solution of HCl is \_\_\_\_\_\_\_\_\_\_\_\_.
2. The acid ionization constant, Ka, is \_\_\_\_\_\_\_\_\_\_ for \_\_\_\_\_\_\_\_\_\_ acids.

1. Calculate the H+ ion and OH- ion concentrations in a 0.50M solution of HBr.

1. Draw the pH scale and give an example of an acid, base, and something neutral.

1. Calculate the pH of 0.075M KOH.
2. When a solution has a pH of 2, what is the pOH of that solution?

1. What is the net ionic equation for the neutralization reaction between HF and KOH?