7/1.2) When solvent molecules surround solute molecules, the process is known as *solvation*. When water is the solvent used, the process is known as *hydration*. Recall that *hydra* means "water."

Write the balanced equation for hydration of CuSO4. Indicate the physical states using the abbreviation (s), (l), or (g) for solid, liquid, or gas, respectively. Use (aq) to indicate the aqueous phase. Indicate appropriate charges on negative and positive ions if they are formed. Express your answer as a chemical equation. Do not include water in your answer.

7/1.3) A sample solution containing sulfate ions (SO42- was analyzed and was found to contain 4 mol of sulfate ions. Calculate the equivalent of sulfate ions present in the solution.

|  |  |
| --- | --- |
| Temperature (⁰C) | Solubility (g/100gH2O) |
| 20 | 11.0 |
| 30 | 23.0 |

7/2.1) The following table gives the solubility of solute Xin water at two different temperatures: You have prepared a saturated solution of Xat 20⁰C using 41.0g of water.

How much more solute can be dissolved if the temperature

is increased to 30⁰C ?

7/4.2) How many grams of glucose are in 295mL of a 5.50% (m/v) glucose solution?

7/4.3) You have a solution that is 18.5% (v/v) methyl alcohol. If the bottle contains 2.28L of solution, what is the volume (V) in milliliters of methyl alcohol?

7/4.3) A 6.00%(m/v) NaCl solution contains 27.1g  of NaCl. What is the total volume of the solution in milliliters?

7/5.1) Calculate the mass percent of a solution that is prepared by adding 40.8 g of NaOH to 498g  of H2O.

7/5.2) Calculate the mass/volume percent of a NaCl solution in which 160g  of NaCl is dissolved in enough water to give a total volume of 1.56L.

7/6.2) What is the final volume in milliliters when 0.547L of a 49.7%  (m/v) solution is diluted to 21.8 % (m/v)?

7/6.3) A 967 mL NaCl solution is diluted to a volume of 1.39L and a concentration of 8.00 M. What was the initial concentration?

7/9.1) How many grams of K2CO3 are in 950mL  of a 2.9% (m/v) K2CO3 solution? Express your answer using two significant figures.

7/10.1 An 80 proof brandy is 40.0% (v/v) ethyl alcohol. The "proof" is twice the percent concentration of alcohol in the beverage.

Top of Form

How many milliliters of alcohol are present in 710 mL of brandy?

Answer using two significant figures.

7/11.1) How many liters of a 4.5 %(m/v) glucose solution would you need to obtain 65 {\rm g} of glucose? Express your answer using two significant figures.

7/12) What is the molarity of a solution containing 18.0g  of KClin 304mL of solution?

7/13) What is the molarity of a 10% (m/v) NaOH solution? Use two significant figures.

7/14.1)

Part A 70.0 mL of 16.0 M HCl diluted to 540mL  
Part B 40.0 mL of 2.50 M NaCl diluted to 160mL

Part C 9.00 mL of 7.50 M KOH diluted to 125mL

8/2.1 Water ionizes to a very small degree into hydronium ions, H3O+ and hydroxide ions, OH-

|  |
| --- |
| \rm 2H_2O(l) \rightleftharpoons H_3O^+(aq)+OH^-(aq) |
| K_{\rm w}=\rm [H_3O^+][OH^-]=1.00 \times 10^{-14} |

The very small value of the equilibrium constant, K_{\rm w}, should give you an appreciation for how few water molecules actually ionize in pure water.

* In neutral solutions, \rm [H_3O^+]=[OH^-].
* In basic solutions, \rm [H_3O^+]<[OH^-].
* In acidic solutions, \rm [H_3O^+]>[OH^-].

But in all aqueous solutions, the product of the hydronium and hydroxide concentrations is equal to K_{\rm w}. Thus,  K_{\rm w}allows you to calculate [H3O+] from [OH-], or vice versa.

Part A 7.00×10−3 mol of HBr are dissolved in water to make 13.0 L of solution. What is the concentration of hydroxide ions, in this solution?

Part B 8.00 g of NaOH are dissolved in water to make 2.00L of solution. What is the concentration of hydronium ions in this solution?

8/8/8

3.1)

Part A What is the pH of an aqueous solution with [H3O+] = 6×10−12 M?

Express the pH numerically using one decimal place.

Part B Carbonated cola is more acidic than coffee or even orange juice because cola contains phosphoric acid. What is the molar concentration of H3O+in a cola that has a pHof 2.670?

Express your answer with the appropriate units.

8/4.1) How many moles of Ba(OH2) are present in 235mL of 0.200M Ba(OH2)?

8/7) Which are some ingredients found in antacids?

Check all that apply{\rm CaCO_3},{\rm NaOH},{\rm CuSO_4},{\rm Mg(OH)_2},{\rm KMnO_4}, {\rm KHCO_3},{\rm AgCl},{\rm Al(OH)_3},{\rm NaHCO_3}

8/8) Solution X has a pHof 9.3, and solution Y has a pHof 7.1.

Express your answer using one significant figure. Top of Form



Bottom of Form

Part B What is the [H3O+] in the solution X?

Part C What is the [H3O+] in the solution Y?

Part D What is the [OH-] in the solution X?

Part E What is the [OH-] in the solution Y?

8/9) Calculate the volume (mL) of a 0.215 M KOH solution that will completely neutralize each of the following:

Part A 2.90 {\rm mL} of a 0.755 {\rm M} {\rm H_2SO_4}solution V_1={\rm mL}

Part B 18.0 {\rm mL} of a 0.570 {\rm M} {\rm HNO_3}solution V_2={\rm mL}

Part C 5.35 {\rm mL} of a 3.18 {\rm M} {\rm H_2SO_4}solution V_3= {\rm mL}

8/10) A 14.0 {\rm mL} sample of vinegar, which is an aqueous solution of acetic acid, {\rm CH}_{3}{\rm COOH}, requires 18.5 {\rm mL} of 0.350 {\rm M} {\rm NaOH}to reach the endpoint in a titration.  
  
{\rm CH}_{3}{\rm COOH}(aq) + {\rm NaOH}(aq) \to  
{\rm CH}_{3}{\rm COONa}(aq) + {\rm H}_{2}{\rm O}(l)

Top of Form

What is the molarity of the acetic acid solution?