**Ch 5 Introduction to Solutions and Aqueous Reactions and Solutions Name:**

*5.1 Molecular Gastronomy and the Spherical Cherry* (interesting application)

*5.2 Solution Concentration (and Solutions Stoichiometry)*

Explain how Gatorade is an aqueous solution using the terms solvent and solute.

Why can’t a 1M solution of NaCl be made by combining 1 mole of NaCl with 1 L of water? *Figure 5.3*

*CC 5.1 \_\_\_ Practice 5.1*

*More Practice 5.1 (Hint: use 1.50mol KBr/1000mL solution as a conversion factor since 1L =1000mL)*

*Practice 5.2 More Practice 5.2*

*Note: Figures 5.3 & 5.4 show solution preparation steps which are often discussed in AP exam questions.*

*Practice 5.3 More Practice 5.3*

*CC 5.3 \_\_\_\_\_ What if the solution represented at the left had its volume reduced to 250mL by evaporation? \_\_\_\_*

*5.3 Solution Stoichiometry*

*Practice 5.4*

*More Practice 5.4 CC5.4 \_\_\_\_*

*5.4 Types of Aqueous Solutions and Solubitity*

Why is water able to pull apart the ions in a solid NaCl?

*Figure 5.8* Which end of a water molecule points toward Na+? toward Cl−?

What is an electrolyte and why is NaCl a strong electrolyte?

Why does sugar dissolve in water but the solution does NOT conduct electricity?

How are acids similar to ionic cmpds?

Why is HCl (in stomach acid) a strong electrolyte while HC2H3O2 (in \_\_\_\_\_\_\_\_\_\_\_\_) is a weak electrolyte?

What does it mean that solubility is a “continuum”?

What would happen if you tested the beaker pictured on the left side of pg 178 with conductivity tester?

*(What would the light bulb do?)*

*Note Table 5.1 is important. AP expects you know the first 2 rules listed.*

*Practice 5.5 Use S or I for your answers. a) \_\_\_\_ b) \_\_\_\_ c) \_\_\_\_ d) \_\_\_\_ CC5.6 \_\_\_\_*

*5.5 Precipitation Reactions*

What is hard water and how does it form “bathtub ring”?

How does Na2CO3 (known as washing soda) prevent the reaction with soap? What are the precipitates?

The reaction shown in *Figure 5.13* is one we perform in lab, except we use NaI instead of KI.

Why doesn’t this difference affect the reaction?

Why doesn’t a precipitate form when KI(aq) is mixed with NaCl(aq)? *(Figure 5.14)*

What is the other “possible” product from the 2KI(aq) + Pb(NO3)2(aq) reaction? Where is it?

*Practice 5.6 (why is there “no reaction”? Practice 5.7*

*CC 5.7 Equation:*

*5.6 Representing Aqueous Reactions: Molecular, Ionic, and Complete Ionic Equations*

From the previous question above about the other “possible” product – what are the ions called and why?

*Follow the steps on pg 184 and Example 5.8*

*Practice 5.8*

*5.7 Acid-Base and Gas Evolution Reactions*

Why do you think acid base reactions are also called “neutralization” reactions? *Hint: pH*

*Note: The “driving force” of the precipitation reactions is the formation of an insoluble precipitate. The driving force of an acid-base rxn is the formation of water (non-electrolyte) and the driving force of a gas evolution rxn is the formation of a gas or an intermediate cmpd (weak electrolyte) that decomposes to form water and a gas.*

According to Arrhenius why is HCl an acid and NaOH a base?

How do hydronium ions form?

Write the 2 different reactions to show the “ionization” of HCl(aq) in solution.

Why is sulfuric acid polyprotic?

How do the arrows in the ionization reactions show that the 2nd H ionization is “weak”?

*Review Table 5.2 It is important to recognize these common acids and bases. Many of them are in common products.*

*Why is ammonia considered a base? Why is it a “weak base”?*

*Examine Figure 5.16 ALL acid base reactions form \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_.*

*Note: salt is another name for ionic cmpd*

*Practice 5.9 (\*Use H2SO4 instead of HBr) (write complete ionic eqn if it helps you determine net ionic eqn)*

*Practice 5.10*

What is a titration? *Look up the terms titrant and analyte.*

How do we know when a reaction has reached the equivalence point? *CC5.9 \_\_\_\_*

In *Figure 5.18* what is the indicator? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *Note: The beaker to the right should be labelled*

*“end point” (the point at which the indicator changes color) Indicators are selected so the “equivalence” point of the reaction is close to the “end point” of the indicator.*

*Practice 5.11 Note: remember 0.158M KOH can be written as 0.158mol KOH/1000mL solution*

*Write the balanced rxn first:*

*More Practice 5.11 Balanced rxn:*

*Note: Use 0.140molHBr/1000mL solution and 1000mL solution/0.200molNaOH as conversion factors in you set up*

*5.8 Gas-Evolution Reactions*

*Look up:* The dihydrogen sulfide gas (formula: \_\_\_\_\_\_\_) formed in the reaction shown here is usually just

called? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sulfide What is the common name of this gas?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_gas

*Be familiar with the Reactant Types, Intermediates, and Gas Evolved in Table 4.3*

*Figure 5.19* shows how baking soda (\_\_\_\_\_\_\_\_\_\_\_\_\_\_) can be used dissolved in water to use as an antacid.

What is the formula of the “intermediate” product formed during this reaction? \_\_\_\_\_\_\_\_\_\_\_\_\_

*Name this product\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ What substance do we drink contains this cmpd?\_\_\_\_\_\_*

What happens to this substance when it forms? (*Hint:* What happens when you open the bottle?)

*Practice 5.12*

*More Practice 5.12*

*5.9 Oxidation-Reduction Reactions*

What is a redox reaction? What do the terms oxidation and reductionmean?

What is an oxidation state/number?

What is the difference between Cl−1 in HCl vs Cl1− in NaCl? *Read paragraph at bottom of pg 194).*

*Review the Rules on pg195 Practice 5.13*

a) \_\_\_\_\_ b) \_\_\_\_\_\_ c) \_\_\_\_\_\_\_\_ d) \_\_\_\_\_\_\_\_ e) \_\_\_\_\_\_\_\_\_ f) \_\_\_\_\_\_\_\_\_\_

*Note example of KO2 in the middle of pg 196. What substance in your bathroom cabinet has the same ox. state for O?*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ *CC 5.10 \_\_\_\_*

*Practice 5.14*

*More Practice 5.14*

Why is oxygen an oxidizing agent while hydrogen a reducing agent?

*Practice 5.15 CC 5.11 \_\_\_\_\_*

*Chemistry in Your Day: Bleached Blonde*  How does hair bleach work? Why does bleached hair become brittle?

Explain why there is a reaction in *Figure 5.23* but NOT in *Figure 5.24.*

Examine *Table 5.4* To determine if a reaction will occur the solid metal placed in a solution must be \_\_\_\_\_\_\_\_\_ *(higher/lower?)* than the metal dissolved in the solution.

*Practice 5.16*

*Exercises(pgs 204-7) 21a, 23b, 27, 29, 31, 35, 37, 39, 42, 43(b,d), 47b, 53c, 54b, 59(a,b,d), 62e, 64, 65b, 73, 76, 79, 85*