Chemistry Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Molarity and Solution Stoichiometry Period \_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_

Show all work!!!

1. 12.2-grams of solid calcium chloride, CaCl2, is dissolved in enough water to make 85.0 mL of solution.

(a) Calculate the molarity of the aqueous calcium chloride, CaCl2 (aq).

(b) Calculate the molarity of the aqueous chloride ions, Cl- (aq). [Hint: Write a balanced equation showing the dissociation of the CaCl2 into separated ions]

2. 25.0 mL of 0.20 M KCl solution is mixed with 15.0 mL of 0.30 M Na2SO4 solution.

(a) Calculate the molarities of the aqueous KCl (aq) and Na2SO4 (aq).

(b) Calculate the molarity of the aqueous sodium ions, Na+(aq).

3. 15.0 mL of 0.50 M NaOH solution is mixed with 25.0 mL of 0.35 M NaCl solution. Calculate the molarity of the sodium ion, Na+, in solution. [Hint: begin this problem by finding the moles of Na+ ion in each of the original solutions]

4. 30.0 mL of 1.0 M HCl is reacted with excess zinc metal.

Zn (s) + 2 HCl (aq) 🡪 H2 (g) + ZnCl2 (aq)

(a) Calculate the moles of HCl in the 30.0 mL of solution.

(b) Calculate the moles of hydrogen gas and zinc chloride produced in the reaction.

(c) How many liters of hydrogen gas does your answer in (a) represent if conditions are at STP?

(d) Calculate the molarity of the aqueous zinc chloride, ZnCl2 (aq), produced.

5. A piece of copper wire is immersed in 100.0 mL of 0.100 M silver nitrate, AgNO3. Answer the following questions if the copper wire is the excess reactant.

Cu (s) + 2 AgNO3 (aq) 🡪 2 Ag (s) + Cu(NO3)2 (aq)

(a) Calculate the moles of AgNO3 in the beaker before the copper is added.

(b) Calculate the moles of silver and copper (II) nitrate produced in this reaction. [Hint: If the copper wire is assumed to be excess, then the AgNO3 must be limiting!]

(c) Calculate the grams of silver produced.

(d) Calculate the molarity of the copper (II) nitrate solution produced in this reaction.

6. 15.0 mL of 0.75 M AgNO3 is added to a beaker containing 120.0 mL of 0.10 M KCl. Upon mixing the AgNO3 and KCl undergo a double replacement reaction, precipitating silver chloride, AgCl (s), and producing aqueous potassium nitrate, KNO3 (aq).

AgNO3 (aq) + KCl (aq) 🡪 AgCl (s) + KNO3 (aq)

(a) Calculate the moles of AgNO3 and KCl that were initially mixed together.

(b) Determine the limiting reagent

(c) Calculate the grams of AgCl that precipitated.