

**Ch4/ PowerPoint Study-4 Solution Stoichiometry Name:**

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Answer these questions as you are watching the videos. They are due in class.

These questions are not just for you to answer but also to prepare you for the exam.

Make sure you understand what you are writing and not just copy from the text book. Show all work.

1) What is the concentration of chloride ions in a 0.35 M solution of calcium chloride.

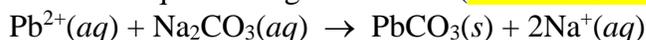
Strategy:

a) What is the formula for calcium chloride? \_\_\_\_\_

b) How many mols of chloride in one mol of calcium chloride? \_\_\_\_\_

c) Set up dimensional analysis to find the molarity of chloride ions.

2) Gravimetric: A 0.4078 g precipitate of lead (II) carbonate forms when a solution of sodium carbonate is added to 100.0 mL solution of the lead (II) solution. What is the concentration of a  $\text{Pb}^{2+}$  solution? The balanced equation is given below. (Ans: 0.01587 M)



Strategy:

a) Convert 0.4078 g of lead (II) carbonate into mols using the formula mass of lead (II) carbonate.

b) What is the mol ratio of lead (II) ions with lead (II) carbonate? \_\_\_\_\_

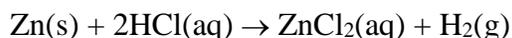
c) What are the mols of lead ions in the solution? (Hint: in this case same as in a)) \_\_\_\_\_

d) Find the molarity using the mols from c) and the volume (in L) given in the problem. (you can also set up the entire answer as dimensional analysis)

- 3) Neutralization: A 34.62 mL of 0.1510 M NaOH was needed to neutralize 50.0 mL of an H<sub>2</sub>SO<sub>4</sub> solution. What is the concentration of the original sulfuric acid solution? (Ans: 0.0523 M)

Strategy:

- a) Write the equation between NaOH and H<sub>2</sub>SO<sub>4</sub> and balance it;
  
  
  
  
  
  
  
  
  
  
  - b) Calculate mols of NaOH in the solution:
  
  
  
  
  
  
  
  
  
  
  - c) What is the mol ratio of NaOH to H<sub>2</sub>SO<sub>4</sub>? Find the mols of H<sub>2</sub>SO<sub>4</sub>.
  
  
  
  
  
  
  
  
  
  
  - d) Divide mols of H<sub>2</sub>SO<sub>4</sub> by L of H<sub>2</sub>SO<sub>4</sub> to get molarity.
- 4) Zinc reacts with hydrochloric acid to yield hydrogen gas. What mass of hydrogen gas is produced when a 500. mL of 1.200M HCl reacts with 7.35 g of zinc? (Ans: 0.225 g)



Strategy:

- a) Calculate mols of both Zn and HCl and find the mols of H<sub>2</sub> formed using mol ratio from the equation. (*Hint: This is a limiting reagent problem*).

- b) Use the smaller mols from above and calculate mass of hydrogen produced.