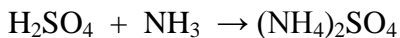


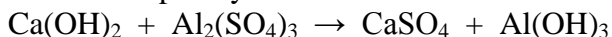
## Worksheet #17      Solution Stoichiometry

1. In a laboratory study of this process, 50.0 mL of sulfuric acid reacts with 24.4 mL of a 2.20 mol/L ammonia solution to produce the ammonium sulfate solution. From this evidence, calculate the concentration of the sulfuric acid.



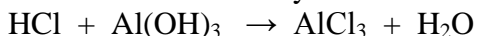
Answer: 0.537 mol/L

2. Calculate the volume of 0.0250 mol/L calcium hydroxide solution required to react completely with 25.0 mL of 0.125 mol/L aluminum sulfate solution.



Answer: 376 mL

3. Determine the volume of 0.10 mol/L stomach acid (HCl) that can be neutralized by 912 mg of aluminum hydroxide in an antacid tablet.



Answer: 351 mL

4. Limestone ( $\text{CaCO}_3$ ) reacts with nitric acid by the following reaction:

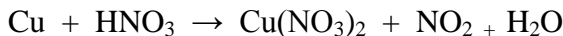


Calculate the mass of limestone that would react with 4.50 L of 0.000250 mol/L nitric acid.

Answer: 0.0563 g

5. Copper metal reacts with nitric acid to produce nitrogen dioxide, aqueous copper (II) nitrate and water. What mass of copper would react with 100. mL of 2.00 mol/L nitric acid?

Answer: 3.18 g



6. Copper metal reacts with silver nitrate solution in a single replacement reaction. Given that a 22.24 g piece of copper is placed in 250 mL of 0.100 mol/L silver nitrate solution:

a) identify the limiting and excess reactants

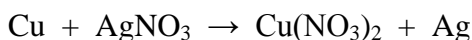
Answer:  $\text{AgNO}_3$ , Cu

b) calculate the mass of the precipitate produced

Answer: 2.70 g

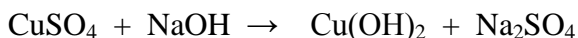
c) calculate the amount of excess species that remains after reaction.

Answer: 21.45 g



7. Copper (II) sulfate reacts with sodium hydroxide to form a bluish-black precipitate. What is the maximum mass of precipitate formed if 100 mL of 0.250 mol/L  $\text{CuSO}_4$  reacts with 100. mL of 0.100 mol/L NaOH?

Answer: 0.488 g



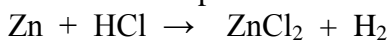
## Worksheet #18

### Gases and Molar Volume

1. How many moles of fluorine gas are found in 86.4 L of the gas at STP?
2. What volume will 8.98 mol of carbon dioxide occupy at STP?
3. What volume will 18.7 g of carbon dioxide occupy at STP?
4. What mass will 86.4 L of fluorine gas have at STP?
5. 5.66 g of a gas occupies 3552 L at STP. What is the molar mass of the gas?
6. 0.041 g of a gas occupies 45.5 mL at STP. What is the molar gas of the gas? Which noble gas it is?

### Gas Stoichiometry

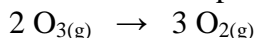
1. Assuming STP conditions, what mass of zinc would have to react with excess hydrochloric acid to produce 18.0 L of hydrogen gas?



4. Assuming STP conditions, what volume of oxygen gas is formed from the complete decomposition of 35.0 g of mercury (II) oxide?

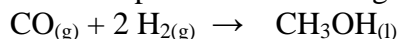


5. Consider the following reaction for the decomposition of ozone in the upper atmosphere:



What volume of oxygen gas (at STP) can be produced from the decomposition of 40 kg of ozone?

6. Methanol can be produced according to the following equation:



At STP, 16.0 L of hydrogen and 25.0 L of carbon monoxide are sealed in the reactor. If 5.30 g of methanol is produced, what is the percent yield for the reaction.