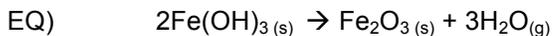


GAS STOICHIOMETRY! Name _____

Fav. Flavor _____

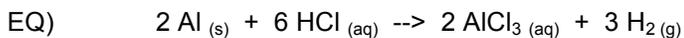
STP CONDITIONS

1) Solid iron (III) hydroxide decomposes to produce iron (III) oxide and water vapor. If 0.75 L of water vapor are produced at **STP**, how many grams of iron (III) hydroxide were used?



Stoich)

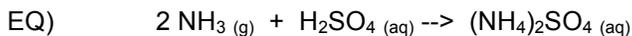
2) Assume that 13.5 grams of solid aluminum react with HCl according to the following balanced equation at **STP**:



How many **liters of H₂ gas** could you ideally produce?

NON-STP CONDITIONS (use **PV=nRT** either before or after stoichiometry)

3) Ammonium sulfate, an important fertilizer, can be prepared by the reaction of ammonia with sulfuric acid according to the following balanced equation:



Calculate the volume of NH₃ (in liters) needed at 20°C and 25.0 atm to react with 150. g of H₂SO₄.
(hint: find moles of NH₃ needed then put in **PV=nRT**)

4) If 45.0 L of natural gas, which is essentially methane (CH₄), undergoes complete combustion at 0.961 atm and 20.°C, **how many grams of CO₂ product is formed?**

EQ: _____ → _____

Math:

5) Fritz Haber, a German chemist, discovered a way to synthesize ammonia gas (NH₃) by combining hydrogen (H₂) and nitrogen gases (N₂) at extremely high temperatures and pressures.

a. Write the balanced equation for this reaction.

_____ → _____

b. If 100. g of nitrogen combines with excess hydrogen at 550.°C and 250. atm, **what volume (Liters)** of ammonia gas is produced?

6) A 3.25 gram sample of solid calcium carbide (CaC₂) reacts with water to produce acetylene gas (C₂H₂) and aqueous calcium hydroxide. If the acetylene was collected at 17°C and 0.9737 atm, how many **Liters** of C₂H₂ were produced?

EQ: $\text{CaC}_2(\text{s}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow \text{C}_2\text{H}_2(\text{g}) + \text{Ca}(\text{OH})_2(\text{aq})$

Math: