

EXTRA PRACTICE: Gas Stoichiometry Practice #2

Name: _____

INSTRUCTIONS: Answer the following questions using proper units and showing all work. Please note that these problems require a balanced chemical equation.

1.
 - a. How many Liters of hydrogen gas will be produced in a single replacement reaction at 7.00°C and 96.0 kPa if 40.0 grams of solid sodium react with liquid water?

 - b. How many grams of sodium are needed to produce 2.24 Liters of hydrogen gas, collected at 23.0°C and 92.5 kPa?

 - c. How many Liters of hydrogen gas at STP can be produced by the reaction of 4.60 grams of solid sodium and excess water?

2. What volume of oxygen (in Liters), collected at 25.0°C and 101 kPa, can be prepared by the decomposition reaction of 37.9 grams of aqueous potassium chlorate?

3. Hydrogen and oxygen gases are burned in a rocket in this synthesis reaction. What volume (in Liters) of water vapor, at 555°C and 573 mmHg, can be produced from 4.67 kg of hydrogen gas?

4.
 - a. Given the following chemical reaction, what mass of magnesium will react with 500 mL of oxygen gas at 150. °C and 0.900 atm?
$$\text{_____ Mg}_{(s)} + \text{_____ O}_{2(g)} + 1350 \text{ KJ} \rightarrow \text{_____ MgO}_{(s)}$$

 - b. How much energy would be needed to produce 5.30 E -19 f.m.u of magnesium oxide?
(Hint: 1 mol = 1350 kiloJoules (KJ) of energy)

5. What volume of ammonia gas can be produced from a synthesis reaction of 22.5 Liters of hydrogen gas reacting with nitrogen gas?
- 6.
- What volume of chlorine gas at 38.0°C and 1.63 atm is needed to react completely with 10.4 grams of solid sodium to produce solid sodium chloride?
 - How many molecules of chlorine gas are needed to completely react with the solid sodium in 6a?
7. One method used in the 18th Century to generate hydrogen gas was to pass steam ($\text{H}_2\text{O}_{(g)}$) through red-hot steel tubes. The following reaction takes place: $\text{Fe}_{(s)} + \text{H}_2\text{O}_{(g)} \rightarrow \text{Fe}_3\text{O}_4_{(s)} + \text{H}_2_{(g)}$
- What volume of hydrogen gas at STP can be produced by the reaction of 6.28 grams of iron?
 - What mass of iron will react with 500. Liters of steam at 250. °C and 1.00 atm of pressure?
 - If 285 grams of Fe_3O_4 are formed, what volume of hydrogen gas, measured at 20.0°C and 1.06 atm, is produced?
8. A 2.55 grams sample of ammonium nitrite (NH_4NO_2) is heated in a test tube. The ammonium nitrite is expected to undergo a decomposition reaction to produce nitrogen gas and water. If it does decompose in this way, what volume of nitrogen gas will be collected? The water and gas temperature are 26.0°C, and the barometric pressure is 0.980 atm.