Gas Stoichiometry Worksheet

Determine the equation for the following reaction, and use it to answer questions 1-3.

Gaseous nitrogen combines with gaseous hydrogen to produce ammonia gas.

1. What volume of nitrogen at STP would be required to react with 0.100 L of hydrogen to produce ammonia?

0.0333 L nitrogen

2. What volume of nitrogen at STP would be required to react with 0.100 g of hydrogen to produce ammonia?

0.370 L nitrogen

3. What volume of nitrogen at 273 K and 101.325 kPa would be required to produce 75.3 g of ammonia?

49.5 L nitrogen

Use the following equation to answer questions 4 and 5.

$$H_2(g)+Cl_2(g) \rightarrow HCl(g)$$

4. What volume of hydrogen would be required to produce 0.400 L of HCl at STP?

Balance reaction! 0.200 L hydrogen

5. What mass of HCl would be produced if 1.50 L of hydrogen was mixed with 2.47 L of chlorine at STP?

109 g HCl

6. Gaseous silane, SiH_4, ignites spontaneously in air according to the reaction

$$SiH_{4\,(g)} + 2\ O_{2\,(g)} \rightarrow SiO_{2\,(s)} + 2\ H_2O_{(g)}$$

If 5.20 L of SiH_4 are treated with O_2, how many liters of O_2 are required for complete reaction? Assume all gases are measured at the same temperature and pressure.

10.4 L oxygen