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Stoichiometry Practice Problems

**Balance the following equations FIRST, then answer the questions:

1. $N_2 + H_2 \rightarrow NH_3$
   How many moles of hydrogen are needed to completely react with 2.0 moles of nitrogen?

2. $C_3H_8 + O_2 \rightarrow CO_2 + H_2$
   How many moles of oxygen are necessary to react completely with 4.0 moles of propane (C_3H_8)?

3. $K_3PO_4 + Al(NO_3)_3 \rightarrow KNO_3 + Al\ PO_4$
   How many moles of potassium nitrate are produced when 2.0 moles of potassium phosphate react with two moles of aluminum nitrate?

4. Hydrogen gas can be produced through the following reaction.
   $Mg\ (s) + HCl\ (aq) \rightarrow MgCl_2\ (aq) + H_2\ (g)$
   a. How many grams of HCl are consumed by the reaction of 2.50 moles of magnesium?
   b. What is the mass in grams of H_2 gas when 4.0 moles of HCl is added to the reaction?

5. Acetylene gas (C_2H_2) is produced as a result of the following reaction.
   $CaC_2\ (s) + H_2O\ (l) \rightarrow C_2H_2\ (g) + Ca(OH)_2\ (aq)$
   a. If 3.20 moles of CaC_2 are consumed in this reaction, how many grams of H_2O are needed?
   b. How many grams of $Ca(OH)_2$ would be formed with 3.20 moles of CaC_2?

6. Laughing gas (nitrous oxide, N_2O) is sometimes used as an anesthetic in dentistry. It is produced when ammonium nitrate is decomposed according to the following reaction.
   $NH_4NO_3\ (s) \rightarrow N_2O\ (g) + H_2O\ (l)$
   a. How many moles of NH_4NO_3 are required to produce 33.0 grams of N_2O?
   b. How many moles of water are produced with 45.0 grams of N_2O?

7. $NaCl + KOH \rightarrow KCl + NaOH$
   How many grams of NaOH will be produced if 15g of NaCl reacts with KOH?

8. $KClO_3 \rightarrow KCl + O_2$
   How many grams of oxygen are produced by the decomposition of 10.0 grams of potassium chlorate?

9. $Zn + HCl \rightarrow ZnCl_2 + H_2$
   How many grams of hydrogen are produced from the reaction of 17.5 grams of zinc?

10. How many grams of sodium are required to react with water to produce 5.0g of sodium hydroxide? (*Unbalanced* equation is: $Na + H_2O \rightarrow NaOH + H_2$)

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