# Stoichiometry Test Study Guide

1). Thionyl chloride, $SOCl_2$, is used as a powerful drying agent. The thionyl chloride reacts with water as shown by the reaction: $SOCl_2(l) + H_2O(l) \rightarrow SO_2(g) + 2HCl(g)$
A) 35.0 grams of thionyl chloride is placed in a glass containing 500.0 grams of water. How many grams of sulfur dioxide will be created?
B) After the reaction is complete how many grams of the excess reactant will remain unreacted?

2). For each of the unbalanced reactions below 5.00 grams of each reactant is mixed together.
A) Balance the reaction.
B) Find the mass of the **first** product made by the reaction.
C) Determine which substance is the limiting reactant.
D) Determine the mass of the excess substance that remains after the reaction is complete.

System #1
$CaC_2 + H_2O \rightarrow Ca(OH)_2 + C_2H_2$

System #2
$Na_2B_4O_7 + H_2SO_4 + H_2O \rightarrow H_3BO_3 + Na_2SO_4$

3). Consider the reaction below. The lead (II) iodide is a bright yellow insoluble substance. Prior to the 1960's it was used as a dye in yellow paint. Lead poisoning could result if you eat the paint so different dye is used in today's paint.
$NaI + Pb(NO_3)_2 \rightarrow NaNO_3 + PbI_2$ (Balance first!!!)
A) If 10.0 grams of sodium iodide react, how many grams of lead (II) iodide are produced?
B) When a student completes this reaction, she filters and dries the lead (II) iodide. The mass of the yellow solid is 8.67 grams. What is the actual, theoretical and percent yield?

4). Laughing gas, $N_2O$, can be turned into smog, $NO_2$, by heating the laughing gas in the presence of oxygen: $2N_2O(g) + 3O_2(g) \rightarrow 4NO_2(g)$
A) 9.00 grams of laughing gas react. How many moles of oxygen react?
B) If 7.50 grams of oxygen react, how many grams of smog are produced?
C) If 2.5 moles of smog needs to be created, how many moles of laughing gas are required?
D) If 3.00 moles of oxygen creates 3.75 moles of smog, what is the percent yield?

5). Define limiting reactant, excess reactant and percent yield and the law of conservation of mass.