Name _____ Period _____

AP Chemistry Test
Chapter 3 Stoichiometry

Let's see if you can do the basics! Five points each

1) One way of producing sodium oxide is from the reaction of sodium liquid with aluminum oxide:

$$\_\_Na + \_\_Al_2O_3 \rightarrow \_\_Al + \_\_ Na_2O$$

a) How much aluminum can be formed from 11.04 grams of sodium?

a) _____

b) How much aluminum can be formed from 10.2 grams of aluminum oxide?

b) _____

c) What is the excess reactant?

c) _____

d) How much of the excess reactant is left over? Answer in grams.

d) _____

e) What is the percent yield if 4.00 grams of aluminum is actually made?

e) _____

Now to a combustion problem.

2) You have a 10.00 g sample of a compound that contains only carbon, hydrogen, and oxygen. Combustion of it yields 19.10 g of CO_2 and 11.73 g of H_2O. What is the molecular formula of the compound if it has a molar mass of around 46 g/mole?

4) From the 2008 AP Exam. Ten points each question.

A 0.150 g sample of solid lead(II) nitrate is added to 125 mL of 0.100 *M* sodium iodide solution. Assume no change in volume of the solution. The chemical reaction that takes place is represented by the following equation. 10 Points each part.

$$Pb(NO_3)_{2(s)} + 2\ NaI_{(aq)} \rightarrow\ PbI_{2(s)} + 2\ NaNO_{3(aq)}$$

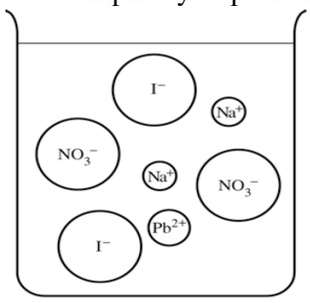
(a) List an appropriate observation that provides evidence of a chemical reaction between the two compounds.

(b) Calculate the number of moles of each reactant.

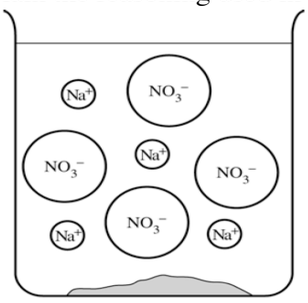
(c) Identify the limiting reactant. Show calculations to support your identification.

(d) Calculate the molar concentration of $NO_3^-{}_{(aq)}$ in the mixture after the reaction is complete.

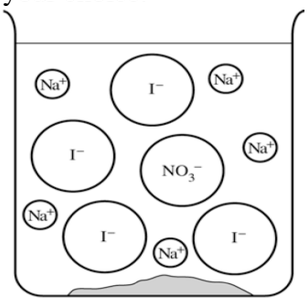
(e) Circle the diagram below that best represents the results after the mixture reacts as completely as possible. Explain the reasoning used in making your choice.



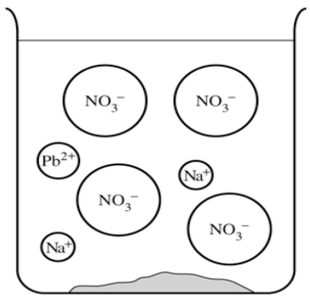
No Precipitate



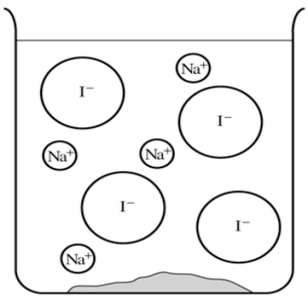
Solid PbI_2



Solid PbI_2



Solid PbI_2



Solid $Pb(NO_3)_2$