1. Cisplatin is a drug that is used to treat testicular cancer. Cisplatin, Pt(NH$_3$)$_2$Cl$_2$, can be made by the reaction of K$_2$PtCl$_4$ with ammonia, NH$_3$. Besides cisplatin, the other product is KCl.

(a) Write a balanced equation for this reaction.

(b) In order to obtain 2.50 g of cisplatin, what masses in grams of K$_2$PtCl$_4$ and ammonia do you need?

2. The ceramic silicon nitride, Si$_3$N$_4$, is made by heating silicon and nitrogen at an elevated temperature

$$\text{Si}(s) + \text{N}_2(g) \rightarrow \text{Si}_3\text{N}_4(s)$$

How many grams of silicon must combine with excess N$_2$ to produce 1.0 kg of Si$_3$N$_4$ if this process is 92% efficient? (In other words, you get a 92% yield.)
3. The following diagram represents the reaction of $A_2$ (shaded spheres) with $B_2$ (unshaded spheres). Write a balanced equation that best describes this reaction.

4. How many moles of product can be make from 1.0 mol of $A_2$ and 1.0 mol of $B_2$ for the reaction in #3?

5. An oxybromate compound, KBrO$x$, where $x$ is unknown, is analyzed and found to contain 52.92% Br. What is the value of $x$?

6. An element X forms an iodide ($XI_3$) and a chloride ($XCl_3$). The iodide is quantitatively converted to a chloride when it is heated in a stream of chlorine:

$$2 XI_3 + Cl_2 \rightarrow XCl_3 + 3 I_2$$

If 0.5000 g of $XI_3$ is treated, 0.2360 g of $XCl_3$ is obtained.

a. Calculate the atomic weight of the element X.

b. Identify the element X.