1.   Aqueous sodium bicarbonate decomposes upon heating in the following manner:

$$NaHCO_{3(aq)} \rightarrow Na_2CO_{3(aq)} + CO_{2(g)} + H_2O_{(l)}$$
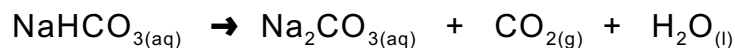
How many moles of $CO_{2(g)}$ will be produced 0.100 mol of sodium bicarbonate decomposes?

2.   1.60 mol of mercury (II) sulfide is decomposed by electrolysis to form its elements. How many moles of sulfur is produced ?

$$HgS_{(s)} \rightarrow Hg_{(l)} + S_{8(s)}$$
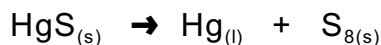
3.   Joe student reacts aqueous solutions of Na_2CO_3 and $Ca(NO_3)_2$. Calcium carbonate and sodium nitrate are produced. He wishes to collect the precipitate from this reaction.
If Joe starts with 10.6 g of Na_2CO_3 what mass of $CaCO_{3(s)}$ should he expect to collect?

$$Na_2CO_{3(aq)} + Ca(NO_3)_{2(aq)} \rightarrow NaNO_{3(aq)} + CaCO_{3(s)}$$
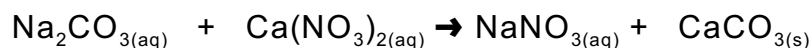
4.   What mass of oxygen is required for the complete combustion of 6.14 mol of gasoline (C_8H_{18})?

5.   Determine the mass of hydrogen gas required to react with nitrogen to prepare 0.62 g of ammonia.

6.   What mass of oxygen must react with 0.56 mol of phosphorus (P_4) to produce solid tetraphosphorus decaoxide?

$$P_{4(s)} \quad + \quad O_{2(g)} \quad \rightarrow \quad P_4O_{10(s)}$$
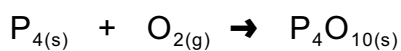
7.   Nitrogen in the cylinder of car reacts with oxygen to produce the pollutant, nitrogen monoxide. What mass of nitrogen monoxide is produced from the combustion of 10.0g of nitrogen gas?

$$N_{2(g)} \quad + \quad O_{2(g)} \quad \rightarrow \quad NO_{(s)}$$