## Station 1

The balanced equation for the combustion of benzoic acid is as follows:
$$2 \ C_7H_6O_2 + 15 \ O_2 \rightarrow 14 \ CO_2 + 6 \ H_2O$$
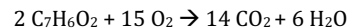
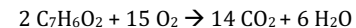A 305.0 g sample of $C_7H_6O_2$ is combined with 512.0 grams of $O_2$.
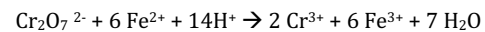    a.  Determine which reactant is in excess.

    b.  When this reaction is carried out, what mass of $CO_2$ will be produced?

    c.  Determine the mass of the excess reactant left over.

**Station 2**

The iron present in a sample of iron ore is converted to $Fe^{2+}$ and reacted with dichromate ion:

$$Cr_2O_7^{\ 2-} + 6\ Fe^{2+} + 14H^+ \rightarrow 2\ Cr^{3+} + 6\ Fe^{3+} + 7\ H_2O$$
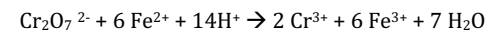
17.6 mL of 0.125 M dichromate is required to react with 25.0 mL sample of $Fe^{2+}$ solution.

    a. What is the molarity of $Fe^{2+}$?

    b. What mass of iron is present in the 25.0 mL sample?

## Station 3

The reaction between nitrogen and hydrogen produces $NH_3$.
  a. What is the balanced equation?


  b. At STP, calculate the volume of $NH_3$ that is produced when 145 L of $N_2$ reacts with excess hydrogen gas.


  c. How many litres of nitrogen react with 581 L of hydrogen at STP?

## Station 4

Consider the following reaction:

$$Mg + HNO_3 \rightarrow Mg(NO_3)_2 + H_2$$

a. What is the balanced equation?

b. If 6.01 g of Mg metal reacts with 8.45 g of $HNO_3$ at STP, what volume of $H_2$ gas is produced?

c. How much excess reactant is left over?