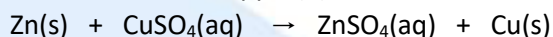# SL & HL Questions on Reacting masses & volumes

**1.** Zinc metal reacts with copper(II) sulfate solution according to the following equation:

$$Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$$

Determine the maximum mass of copper that can be deposited when 1.20 g of zinc is added to 50.0 cm^3 of 2.00 x 10^{-1} mol dm^{-3} copper(II) sulfate solution.

2. Calculate the mass of carbon dioxide produced when 150 cm^3 of 1.00 mol dm^{-3} hydrochloric acid, HCl(aq), is added to 10.0 g of calcium carbonate, $CaCO_3$.

3. A student prepared ethene by dehydrating ethanol.

$$C_2H_5OH(l) \rightarrow C_2H_4(g) + H_2O(l)$$
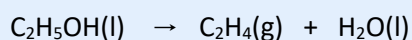
She started with 9.36 g of ethanol and made 2.12 g of ethene. Calculate the percentage yield she obtained for this reaction.

4. A sample of gas occupies 67.2 cm^3 at a temperature of 22.0 $^{\circ}C$ and a pressure of 9.38 x 10^4 Pa. Calculate the volume the gas will occupy if the temperature is increased to 29.0 $^{\circ}C$ and the pressure increased to 1.06 x 10^5 Pa.

5. 2.50 dm^3 of gas at a temperature of 19.0 $^{\circ}C$ and a pressure of 1.01 x 10^5 Pa has a mass of 4.59 g. Determine the molar mass of the gas.

6. The molecular formula of a gaseous hydrocarbon can be determined by combusting it completely in excess oxygen and then passing it through potassium hydroxide solution to absorb the carbon dioxide produced. In an experiment 200 cm^3 of a hydrocarbon was reacted with 1500 cm^3 of oxygen. After the hydrocarbon had combusted completely 1000 cm^3 of gas remained. This volume was reduced to 200 cm^3 after the gas had been passed through a solution of potassium hydroxide. (All volumes were measured under the same conditions of temperature and pressure.)
Deduce the formula of the hydrocarbon.