**COSTAATT**

**CHEM092 – Introduction to Concepts in Chemistry II**

**Lesson 3**

**Homework – Calculations based on chemical equations.**

(1) Chromium is manufactured by heating a mixture of chromium(III) oxide with aluminium powder.

Cr2O3(s) + 2Al(s) → 2Cr(s) + Al2O3(s)

(a) Calculate the mass of aluminium needed to react with 1 tonne of chromium(III) oxide. (RAMs: O = 16; Al = 27; Cr = 52)

(b) Calculate the mass of chromium produced from 1 tonne of chromium(III) oxide.

(2) Carbon monoxide burns according to the equation:

2CO(g) + O2(g) → 2CO2(g)

(a) Calculate the volume of oxygen needed for the complete combustion of 100 cm3 of carbon monoxide.

(b) What volume of carbon dioxide will be formed?

(3) Calculate the volume of hydrogen (measured at room temperature and pressure) obtainable by reacting 0.240 g of magnesium with an excess of dilute sulphuric acid. (RAM: Mg = 24. Molar volume = 24 000 cm3 at rtp)

Mg(s) + H2SO4(aq) → MgSO4(aq) + H2(g)