CALCULATIONS BASED ON EQUATIONS

$CH_4 (g) + 2O_2 (g) \longrightarrow CO_2 + 2H_2O$

1 mol 1Mol

1: Identify the substances in the question which are involved.

2: Identify the No. of Moles of these substances.

3: Work out m=n x FM for both substances

M=n x FM M=n x FM

M=1 x 16 M=1 x 44

M=16g M=44g

4: Use proportion to work out the solution.

16g ⟷ 44g

1g ⟷ 44/16

8g ⟷ 44/16 x 8 = 22g

VOLUMETRIC TITRATION

Conc x Vol x H^+ = Conc x Vol x OH^-

E.g.

Conc x Vol x H^+ = Conc x Vol x OH^-

0.5 x Vol x 1 = 0.1 x 25 x 1

$$\text{Vol} = \frac{0.1 \times 25}{0.5} = 5\text{cm}^3$$

SPECTATOR IONS

Reaction of a dilute acid with an alkali.

E.g. the reaction of sodium hydroxide solution with dilute hydrochloric acid

$HCl (aq) + NaOH (aq) \longrightarrow NaCl (aq) + H_2O (l)$

This equation can be rewritten to show the ions present.
Since water is made up almost entirely of molecules (covalent bonding) it is left unchanged.

$H^+ (aq)$ and $Cl^- (aq)$ + $Na^+ (aq)$ and $OH^- (aq)$

↓

$Na^+ (aq)$ and $Cl^- (aq)$ + $H_2O (l)$

Both the Na+ (aq) and Cl- (aq) have not changed during the reaction. These ions are both spectator ions and can be cancelled out to show the actual reaction taking place.

$H^+ (aq)$ and ~~$Cl^- (aq)$~~ + ~~$Na^+ (aq)$~~ and $OH^- (aq)$

↓

~~$Na^+ (aq)$~~ + ~~$Cl^- (aq)$~~ + $H_2O (l)$

Hence, $H^+ (aq)$ + $OH^- (aq) \longrightarrow H_2O (l)$

This equation shows the OH- (aq) of the alkali reacting with the H+ (aq) of the acid. It is called an ion equation. The ion equation shows the ions that take actually take part in the reaction. The ion equation is the same for the neutralisation of any acid with any alkali.