Writing Chemical Equations & Calculations in MS Word

1. Balanced Chemical Equations

A strong acid/base is one that fully dissociates in solution, e.g.:

$$HCl \rightarrow H^+ + Cl^-$$

$$H_2SO_4 \rightarrow 2H^+ + SO_4^{2-}$$

$$NaOH \rightarrow Na^+ + OH^-$$

A weak acid/base only partially dissociates in solution, e.g.:

$$CH_3COOH \rightleftharpoons CH_3COO^- + H^+$$

$$NH_3 + H_2O \rightleftharpoons NH_4^+ + OH^-$$

2. Worked Calculations

Question

23.1 cm^3 of a solution of hydrochloric acid neutralised 25 cm^3 of a 0.05 M solution of sodium carbonate. Calculate the molarity of the hydrochloric acid solution.

$$Na_2CO_3 + 2HCl \rightarrow 2NaCl + H_2O + CO_2$$

Let HCl be reagent a: then M_a = ?, V_a = 23.1 cm^3 and a = 2.

Let Na_2CO_3 be reagent b: then M_b = 0.05 M, V_b = 25 cm^3 and b = 1.

Using the formula:

$$\frac{M_a V_a}{a} = \frac{M_b V_b}{b}$$

then:

$$\frac{M_a \, x \, 23.1}{2} = \frac{0.05 \, x \, 25}{1}$$

$$\frac{M_a \, x \, 23.1}{2} = 1.25$$

$$M_a \, x \, 23.1 = 2.5$$

$$\boldsymbol{M_a = 0.108 \text{ M}}$$