**14.2 Brønsted-Lowry Acids and Bases**

**A hydrogen ion (H+) is a hydrogen atom that has lost its only electron. In most cases a hydrogen ion is a proton. Chemists often use the terms *hydrogen ion* and *proton* interchangeably.**

* According to the Brønsted-Lowry theory:
  + A substance behaves as an acid when it donates a proton (H+) to a base
  + A substance behaves as a base when it accepts a proton from an acid.

Therefore;

* Acids are proton donors and
* Bases are proton acceptors.

Remember how hydrogen chloride molecules ionise in water:

In this reaction each hydrogen chloride molecule has donated a proton to a water molecule. The hydrogen chloride molecule has acted as an acid. The water molecule has accepted a proton so has acted as a base.

**Acid-base Conjugate Pairs**

* A conjugate pair is two species which differ by a proton (H+)
* Because HCl and Cl- can be formed from each other by the loss or gain of a single proton, they are called a conjugate acid/base pair.

For the reaction between HCl and H2O, the conjugate pairs are:

Identify the conjugate acid/base pairs for the following reaction:

NH3(aq) + H2O(l) NH4+(aq) + OH-(aq)

**Amphiprotic Substances**

* Some substances can behave as either an acid or a base, depending on what they are reacting with.
* They can donate or receive protons.
* Such substances are said to be amphiprotic.

Water can act as either an acid or base.

H2SO4(l) + H2O(l) HSO4-(aq) + H3O+(aq)

O2- + H2O(l) OH-(aq) + OH-(aq)

Identify the acid and bases in the above reactions.

Examples of amphiprotic substances include H2O, HCO3- and HSO4

When an amphiprotic substance is placed in water, it reacts as both an acid and a base.

Write the products for the following reactions where hydrogen carbonate acts as both a base and acid.

HCO3-(aq) + H2O(l)

HCO3-(aq) + H2O(l)

Although both reactions are possible for all amphiprotic substances in water, generally one reactions occurs to a greater extent. The dominant reaction can be identified by measuring the pH of the solution.

**Text Questions: 1-5**

**Worksheet 28**