

PENANG SANGAM HIGH SCHOOL
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P.O.BOX 44, RAKIRAKI

LESSON NOTES

WEEK 23

Year/Level: 13A/B

Subject: Chemistry

Strand 3	Reactions
Sub Strand 3.3	Aqueous Chemistry
Content Learning Outcome	By the end of this lesson students should be able: <ul style="list-style-type: none">• Define acids and bases and give examples• Define an amphiprotic substance and give examples

Acid and Bases

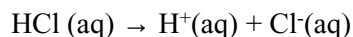
There are three general concepts about acids and bases.

1. The Arrhenius concept

- ★ An acid is a substance which gives H^+ ions when dissolved in water and a base is a substance which gives OH^- ions when dissolved in water.

Example

Acid



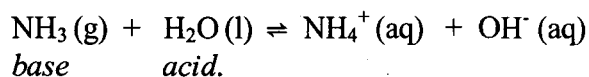
Base



2. The Bronsted-Lowry concept

- ★ An acid is a proton (H^+ ion) donor and a base is a proton acceptor.

Example:



Conjugate Base

- ★ Species formed when a proton is removed from an acid. E.g. OH^- in the above example.

Conjugate Acid

- ★ Species formed when a proton is added to base. E.g. NH_4^+ .

Note:

- ★ A strong conjugate base has a weak conjugate acid and vice-versa.

★ A weak conjugate base has a strong conjugate acid and vice-versa.

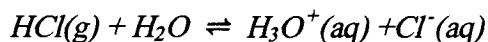
Amphiprotic

★ Substance which can either accept or donate a proton.

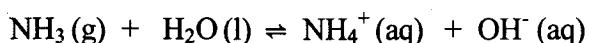
Example:

1. Water

- Water accepts a proton from HCl.

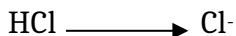


However, it donates a proton when it reacts with NH_3



Note:

- ★ Strong conjugate base has a weak conjugate acid and vice-versa.
- ★ Weak conjugate base has a strong conjugate acid and vice-versa.
- ★ Conjugate base can form by removing an H^+ from an acid.



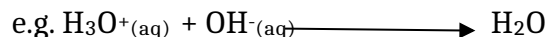
Acid conjugate base

- ★ Conjugate acid is formed by adding an H^+ to a base.



Base conjugate acid

In a neutralization reaction a conjugate acid reacts with a conjugate base to form water.



Exercises

1. Give the conjugate acids of the following:

a. OH^-

b. HS^-

c. CH_3NH_2

2. Give the conjugate bases of the following

a. NH_4^+

b. H_2PO_4