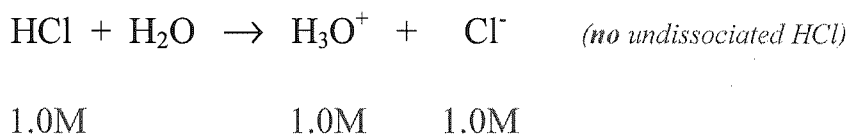


## 5. Strength of Acids and Bases

### a) What is a Strong Acid?

- i) 100% dissociated in water
- ii) No reverse reaction. Not in equilibrium.
- iii) Example:

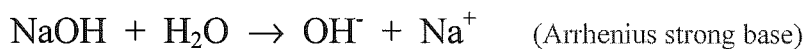


- iv) There are six strong acids. Refer to “Relative Strengths of Acids and Bases” p.334 Hebden.
- v) All six strong acids have the same net result when added to water:  
$$\text{H}^+ + \text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+ \quad (\text{line 7 on table})$$
- vi) Therefore,  $\text{H}_3\text{O}^+$  is the strongest acid that can exist in water.
- vii) And since, all six strong acids produce the same  $[\text{H}_3\text{O}^+]$  in water, they have the same strength.
- viii) This is called the “**Levelling Effect**” (the six strong acids are equal in producing  $\text{H}_3\text{O}^+$ )
- ix) Strong acids do not have conjugate bases.

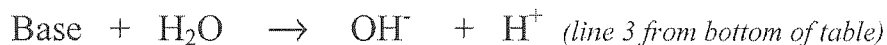
### b) What is a Strong Base?

- i) 100% dissociated in water
- ii) No reverse reaction. Not in equilibrium.
- iii) There are **two** strong *Bronsted-Lowry* bases. Refer to “Relative Strengths of Acids and Bases” p.334 Hebden.
- iv) All metal hydroxides are also strong bases.

v) Examples:



vi) All strong bases have the same net result when added to water:



vii) Therefore,  $\text{OH}^-$  is the strongest base that can exist in water.

viii) And since, all strong bases produce the same  $[\text{OH}^-]$  in water, they have the same strength.

ix) This is another instance of the “**Levelling Effect**”

x) Strong bases do not have conjugate acids

### ***c) What is a Weak Acid?***

i) Not 100% dissociated in water.

ii) They form an equilibrium.

iii) There are **29** weak acids. Refer to “Relative Strengths of Acids and Bases” p.334 Hebden on the left side of the equilibrium ( $\text{HIO}_3$  to  $\text{H}_2\text{O}$ ).

iv) The higher up in the table, the stronger the acid. Stronger = more dissociation!

