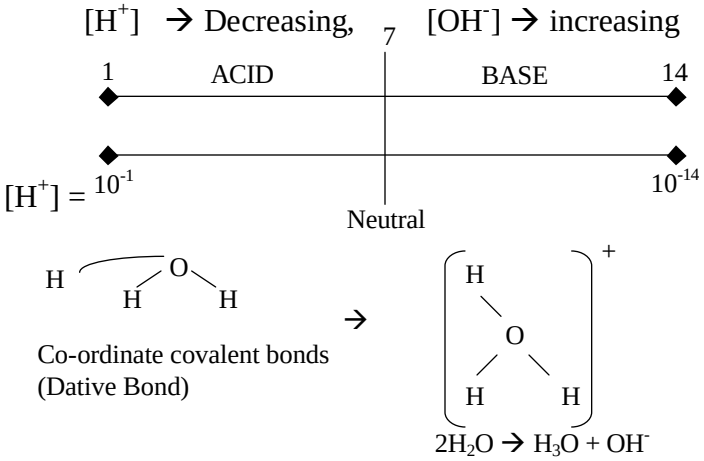
pH Scale

$$pH = -\log[H^+]$$
$$= -\log 10^{-1}$$
$$= 1$$

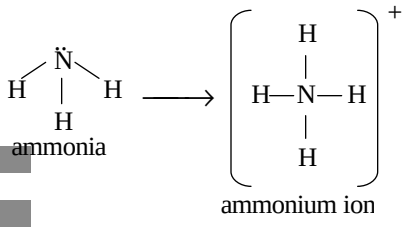
$$_1H \quad \frac{1e}{1pt}$$

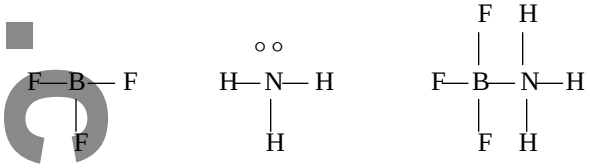
$$H^+ \quad 1pt$$



A **co-ordinate covalent bond** is when one of the atoms involved in the single covalent bonds donates both of the electrons in the formation of the single covalent bonds, instead of each of the atoms donating an electron each to form the single covalent bond.
Once the co-ordinate covalent is formed, it is impossible to distinguish from other single covalent bonds.

pH = 7 = $[H_3O^+]$ = $[OH^-]$





$H^+ + OH^- \rightarrow$

pH Calculations

Calculate the pH of the following

1. 0.01 mol/L HCl

$$HCl \longrightarrow H^+ + Cl^-$$
$$0.01 \qquad 0.01$$
$$= 10^{-2}$$
$$pH = -\log(10^{-2})$$
$$= 2.0$$

2. 0.02 mol/L H_2SO_4

$$H_2SO_4 \longrightarrow 2H^+ + SO_4^{2-}$$
$$0.02 \qquad\quad 0.04$$
$$= -\log(4 \cdot 10^{-2})$$
$$= 1.4$$

3. 0.05 mol/L H_3PO_4

$$H_3PO_4 \longrightarrow 3H^+ + PO_4^{3-}$$
$$0.05 \qquad\quad 0.15$$
$$= -\log(1.5 \cdot 10^{-1})$$
$$= 0.8$$

$H_2O \longrightarrow H^+ + OH^-$

$K_w = [H^+]\,[OH^-] = 1 \times 10^{-14}$ at 25 °C

↑

ionization dissociation constant for H_2O

Determine:

1. $[H^+] = 0.10$ mol/L
2. $[OH^-] =$
3. pH of 0.10 M HCl

1. $K_w = [H^+]\,[OH^-]$

$1 \times 10^{-14} = (0.1)\,[OH^-]$

$[OH^-] = 10^{-13}$

pH = 1