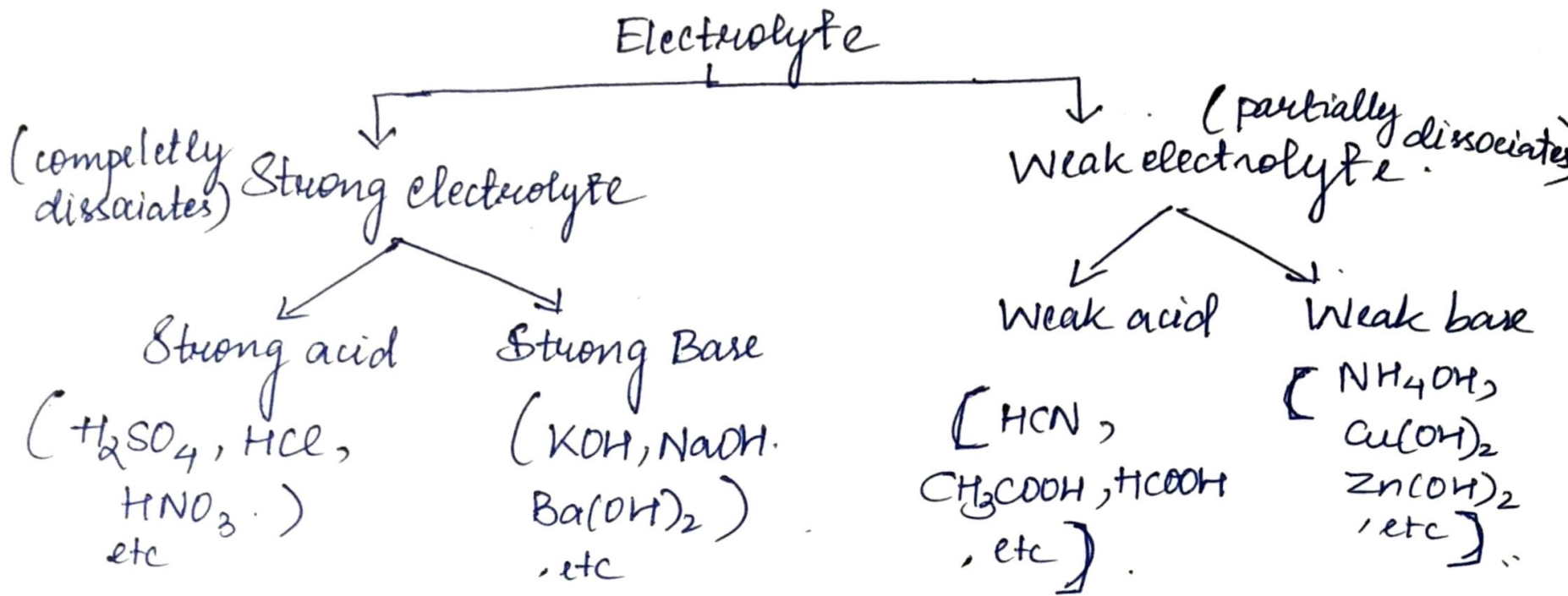
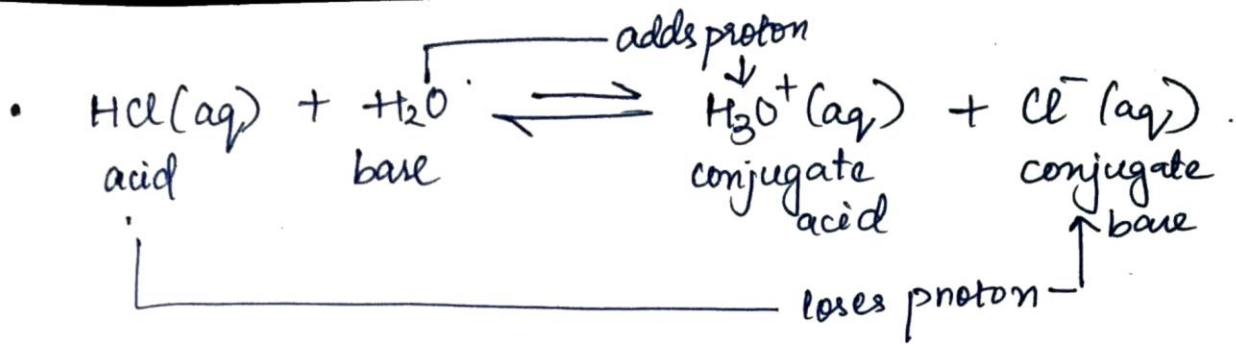


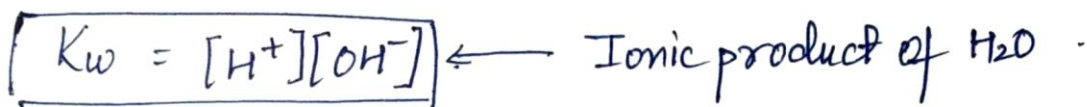
# Concept and Formula



- Acids — substances that dissociates in water to give  $H^+$  ions. Ex,  $H_2SO_4$ ,  $HNO_3$ , etc.
- Base — substances that dissociates in water to give  $OH^-$  ions. Ex,  $NaOH$ ,  $KOH$ , etc.
- Salts — substance that produced by the reaction of an acid with a base. Ex,  $NaCl$ ,  $NaHCO_3$ , etc.



Ionization Constant of  $\text{H}_2\text{O}$



In solutions :-

- Acidic  $\Rightarrow [\text{H}_3\text{O}^+] > [\text{OH}^-]$
- Neutral  $\rightarrow [\text{H}_3\text{O}^+] = [\text{OH}^-]$
- Basic  $\Rightarrow [\text{H}_3\text{O}^+] < [\text{OH}^-]$

\* pH Scale

- $\text{pH} = -\log [\text{H}^+]$
- $\text{pOH} = -\log [\text{OH}^-]$

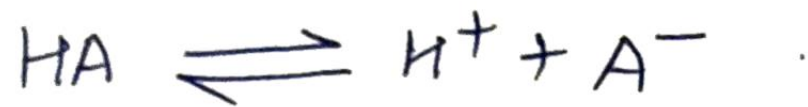
•  $K_w = [\text{H}_3\text{O}^+][\text{OH}^-] = 10^{-14}$

$$\text{pH} + \text{pOH} = 14$$

Acidic sol<sup>n</sup>,  $[\text{H}^+] > 10^{-7} \text{ M}$ .  
 Basic sol<sup>n</sup>,  $[\text{H}^+] < 10^{-7} \text{ M}$ .  
 Neutral sol<sup>n</sup>,  $[\text{H}^+] = 10^{-7} \text{ M}$ .

\* Higher the pH  $\Rightarrow$  Lower the ACIDIC strength.

$\text{pH} = 14 - \text{pOH}$



$$K_a = \frac{[H^+][A^-]}{[HA]}$$

• For weak acid

$$pH = \frac{1}{2} pK_a - \frac{1}{2} \log[HA]$$



$$K_b = \frac{[B^+][OH^-]}{[BOH]}$$

$$pK_a = -\log[K_a], \quad pK_b = -\log[K_b]$$

$$K_w = K_a \times K_b$$