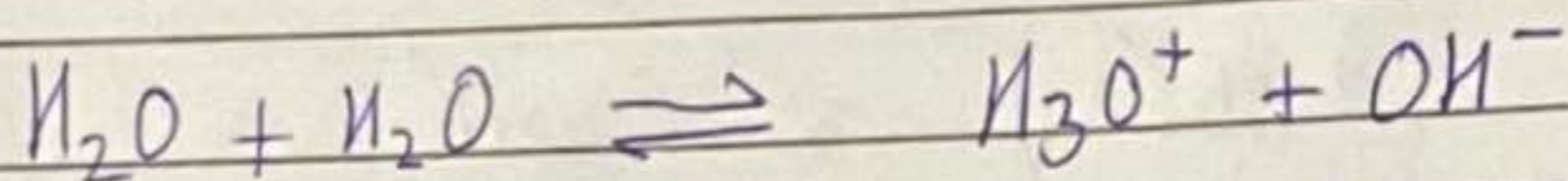
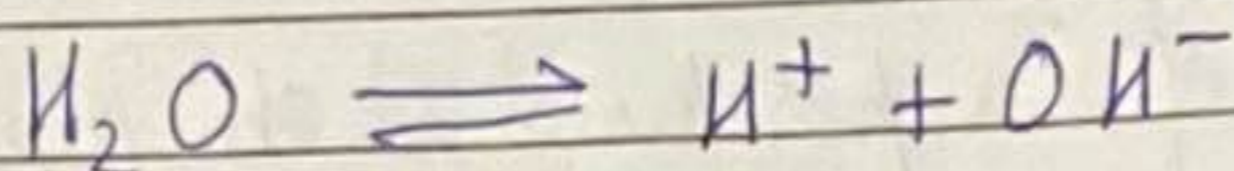


VIDEO - 6

Section:- Dissociation of Water

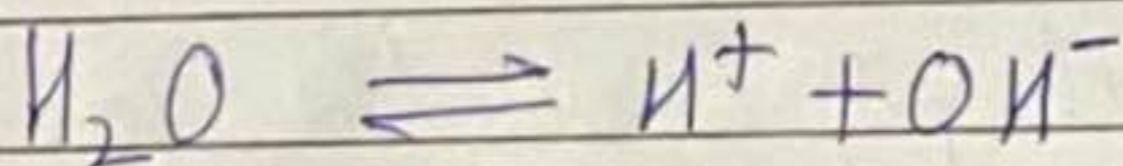
$$K = \frac{[\text{H}_3\text{O}^+][\text{OH}^-]}{[\text{H}_2\text{O}]^2} \Rightarrow K[\text{H}_2\text{O}]^2 = [\text{H}_3\text{O}^+][\text{OH}^-] = K_w$$

$$\therefore K_w = [\text{H}_3\text{O}^+][\text{OH}^-] = 1 \times 10^{-14} \text{ mol}^2 \text{ dm}^{-6} \text{ at } 300\text{K} \text{ for pure water.}$$

Here, K_w is called Ionic Product.

Section :- Salt Hydrolysis

For Salt of Strong Acid and Strong Base



$$K_w = [\text{H}^+][\text{OH}^-] = [\text{H}^+]^2$$

$$\therefore [\text{H}^+] \Rightarrow \sqrt{K_w}$$

p_{OH} of Salt of Weak Acid and Strong Base

$$p_{\text{OH}} = \frac{-1}{2} [\log K_w - \log K_a + \log C]$$

$$\Rightarrow \frac{1}{2} [pK_w - pK_a - \log C_{\text{salt}}]$$

pH of Salt of Strong Acid and Weak Base

$$pH = \frac{1}{2} (pK_w - pK_b - \log C_{\text{salt}})$$