



$$K_a = \frac{[\text{CH}_3\text{COO}^-][\text{H}^+]}{[\text{CH}_3\text{COOH}]}$$

$$\text{at } t \quad \begin{array}{ccc} & 1 & 0 \quad 0 \\ & 1 - \alpha & \alpha & \alpha \end{array}$$

$$K_a = \frac{\alpha^2}{1 - \alpha} \quad \text{i) } (\alpha < 6.4 \times 10^{-2}) \text{ then } (1 - \alpha \approx 1)$$

$$\alpha = K_a$$

for 'C' conc.

$$\begin{array}{ccc} C & 0 & 0 \\ C - C\alpha & C\alpha & C\alpha \end{array}$$

$$K_a = \frac{C\alpha^2}{C(1-\alpha)} \approx K_a = \frac{C\alpha^2}{1}$$

$$\Rightarrow \left(\alpha = \sqrt{\frac{K_a}{C}} \right) \quad \boxed{[\text{H}^+] = C\alpha = \sqrt{K_a C}}$$

$$\text{pH} = -\log[\text{H}^+] = -\log \sqrt{K_a C} = -\frac{1}{2} \log K_a - \frac{1}{2} \log C$$

$$\text{Simi log } \beta \quad \left[[\text{OH}^-] = \sqrt{K_b C} \right] \quad \boxed{\text{pOH} = 14 - \log[\text{OH}^-]} \quad (\text{pOH})$$

Salt Hydrolysis

$$K_w = [\text{H}^+][\text{OH}^-] = 10^{-14} \quad \text{at } 300\text{K for pure water}$$

$$\text{i) } \text{pH} \text{ (conc. } \approx 10^{-7})$$

$$C_{\text{total}} = (10^{-7} + C) \quad \text{e.g. if } C = 10^{-8}$$

$$= 10^{-7} \left[1 + \frac{1}{10} \right] = \left(\frac{11}{10} \times 10^{-7} \right)$$