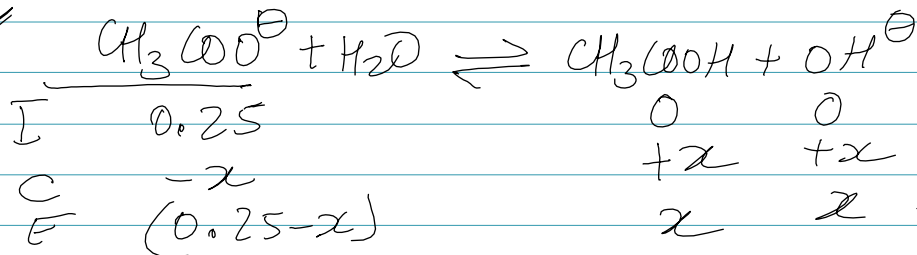


Acid-Base Eq (7) pH of Salts.

① Calculate the pH of a 0.25 M CH_3COONa acetic acid $K_a = 1.8 \times 10^{-5}$
 $\text{CH}_3\text{COO}^\ominus$ base in soln; OH^\ominus ions will be in soln; then.
 use K_b



$$K_b = \frac{1 \times 10^{-14}}{1.8 \times 10^{-5}} = 5.6 \times 10^{-10}$$

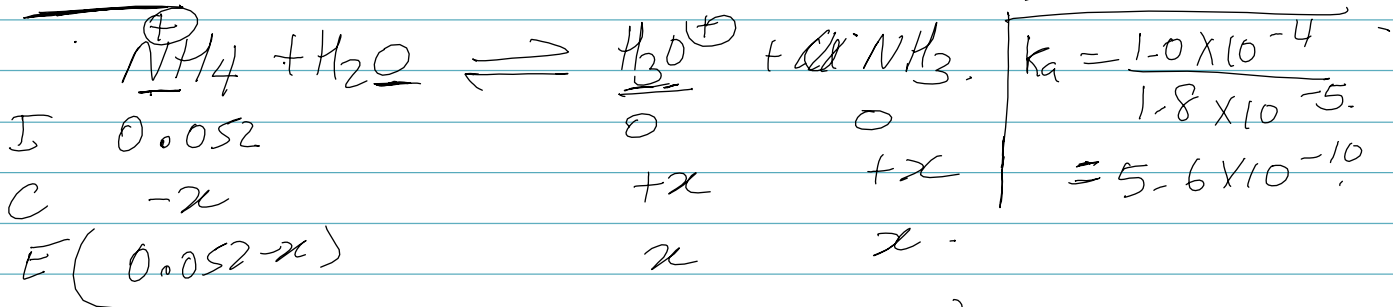
$$K_b = 5.6 \times 10^{-10} = \frac{x^2}{0.25-x} \approx \frac{x^2}{0.25}$$

$x^2 = 0.25 \times 5.6 \times 10^{-10}$; take square root $x = 1.2 \times 10^{-5}$ [OH[⊖]]
 $-\log 1.2 \times 10^{-5} = 4.92 = \text{pOH}$; $\text{pH} = 14 - 4.92 = \boxed{9.08}$

② Calculate the pH of a 0.052 M NH_4Cl solution.

$K_b = 1.8 \times 10^{-5}$ of NH_3

NH_4^\oplus is weak acid, soln will have $\text{H}_3\text{O}^\oplus$; need K_a



$$K_a = \frac{1.0 \times 10^{-14}}{1.8 \times 10^{-5}} = 5.6 \times 10^{-10}$$

$$K_a = 5.6 \times 10^{-10} = \frac{x^2}{0.052-x} \approx \frac{x^2}{0.052}$$

$x^2 = 5.6 \times 10^{-10} \times 0.052$ $x = 5.4 \times 10^{-6} \text{ M}$

$-\log 5.4 \times 10^{-6} \text{ M} = \boxed{5.27}$