

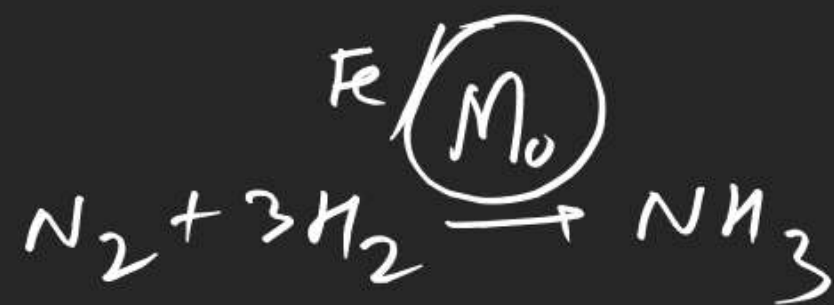
(27)



Rate \propto no. of photons striking/sec
 \propto photo intensity
 $\propto I$

Rate = Const
Zero order

zero order



rate \propto surface area
 $= \text{Const}$

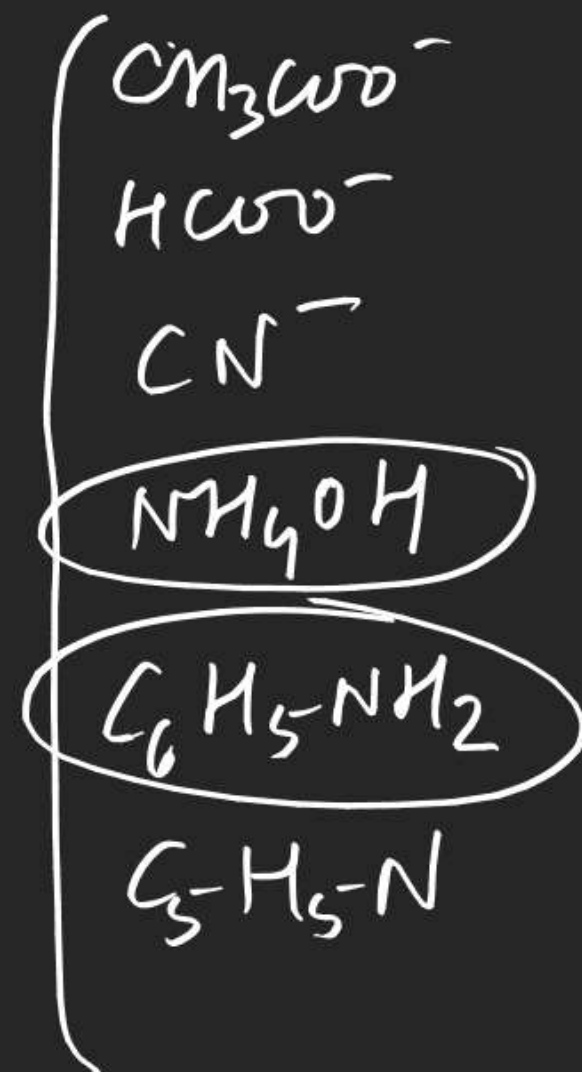
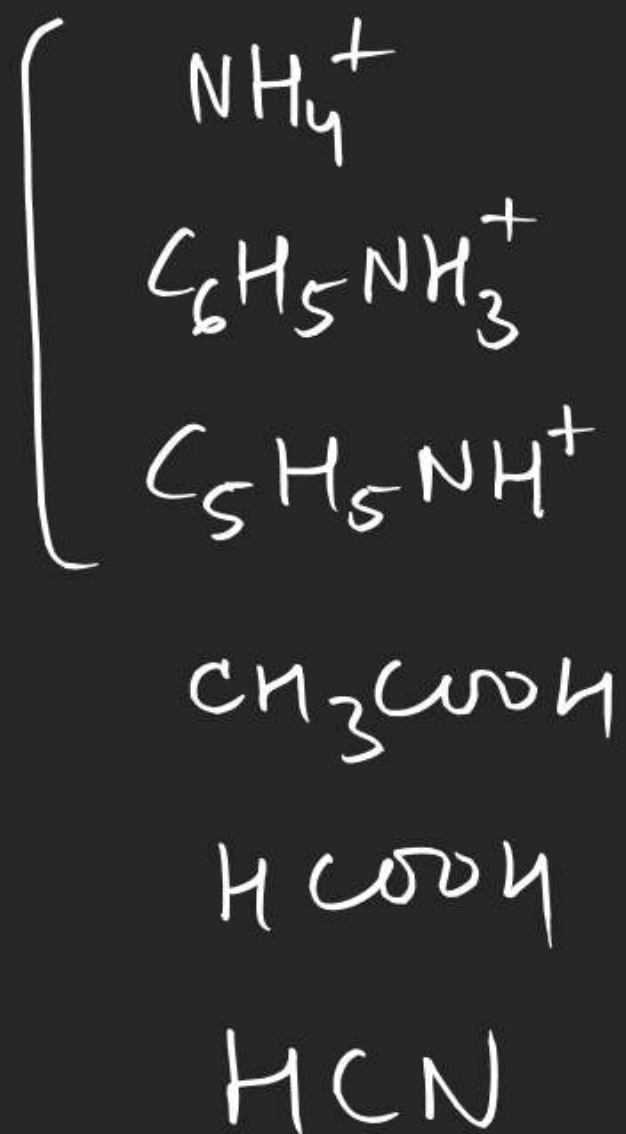
Zero order

- ① enzyme catalysed Rxn
 ② photochemical
 ③ Surface catalysed Rxn



⑧ Rate = $Z_{12} \times e^{-E_a/RT} \times P$

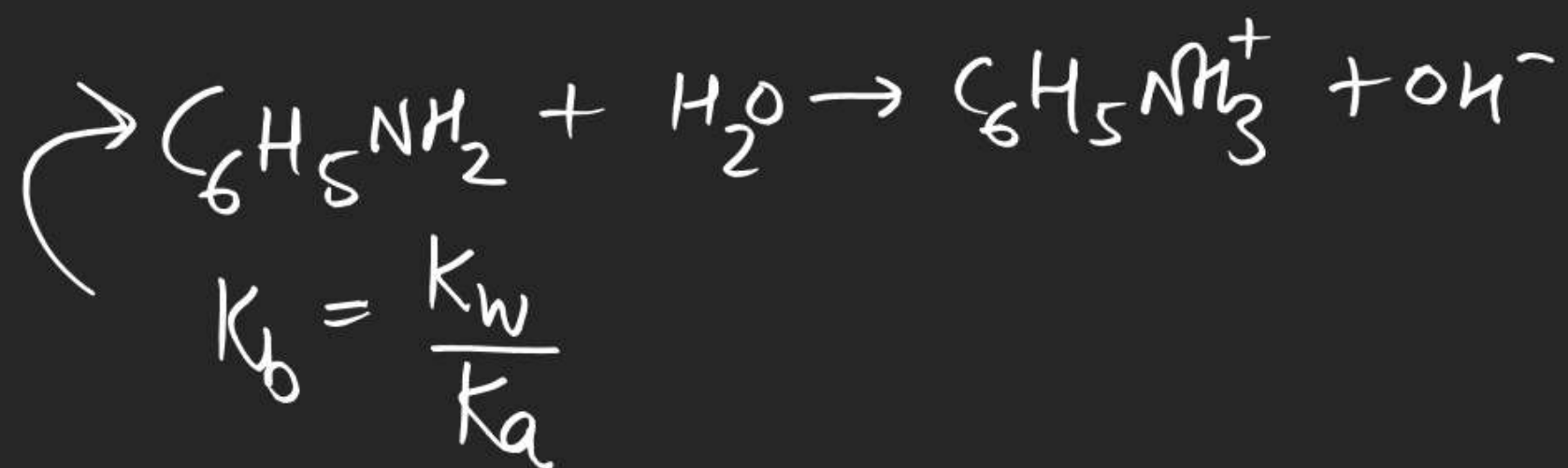
= $(Z_{12} \times P) \times e^{-E_a/RT}$



$$\frac{\text{CH}_3\text{COOH}}{K_a} \times \frac{\text{CH}_3\text{COO}^-}{K_b} = K_w$$

$$\frac{\text{HCN}}{K_a} \times \frac{\text{CN}^-}{K_b} = K_w$$

$$\frac{\text{C}_6\text{H}_5\text{NH}_2}{K_b} \times \frac{\text{C}_6\text{H}_5\text{NH}_3^+}{K_a} = K_w$$



Salt hydrolysis \rightarrow Salts are considered to be strong electrolyte.

(BA)



These ions react with H_2O to produce H^+ or OH^- hence solution becomes acidic or basic

Case-I salt formed by SA + SB

e.g. NaCl, KNO_3 , KI



pH = 7

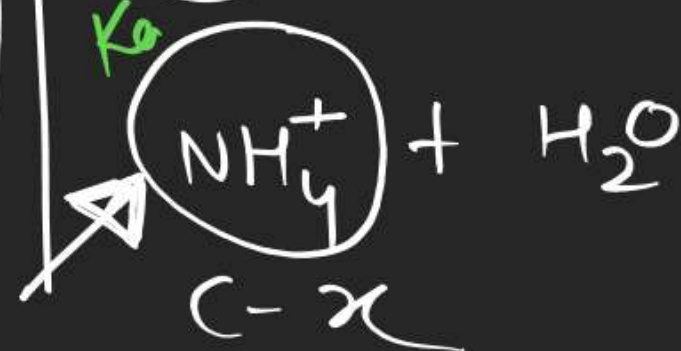
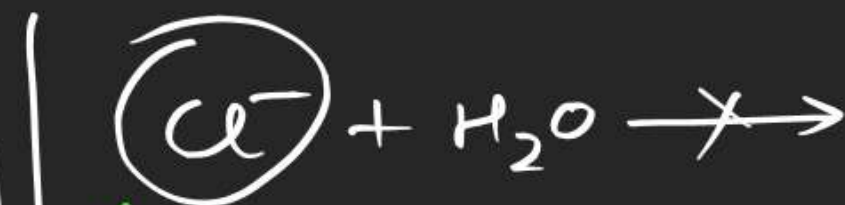
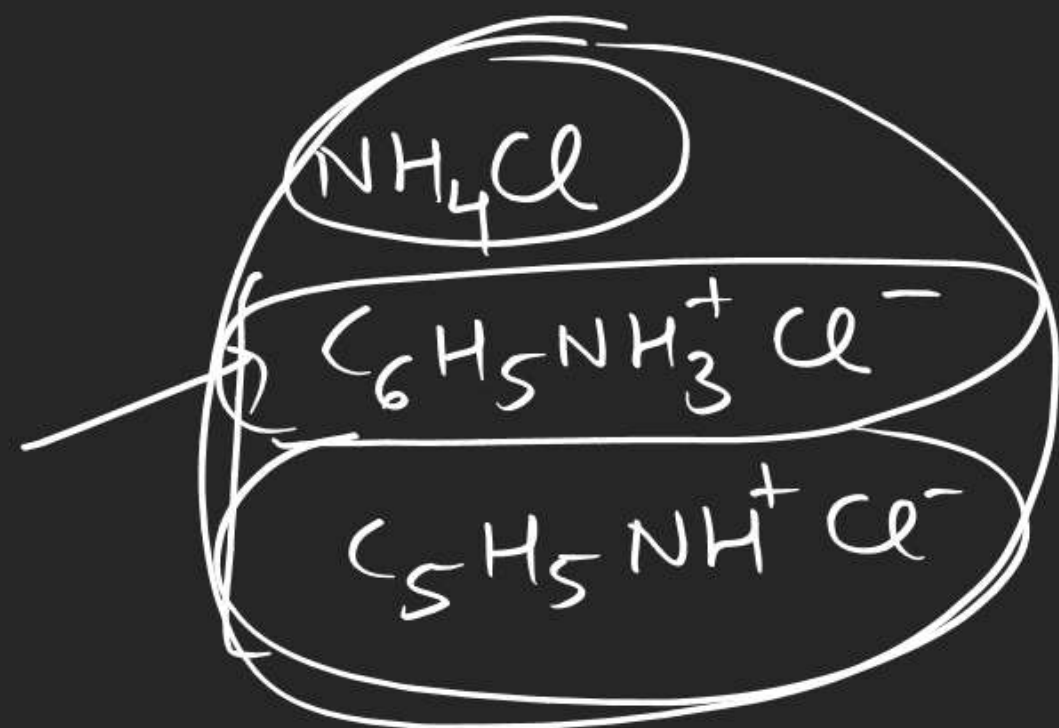
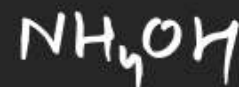
NaOH
SB

Na^+
V.V weak acid

Case-II

Salt formed by SA + WB

(Acidic salt)

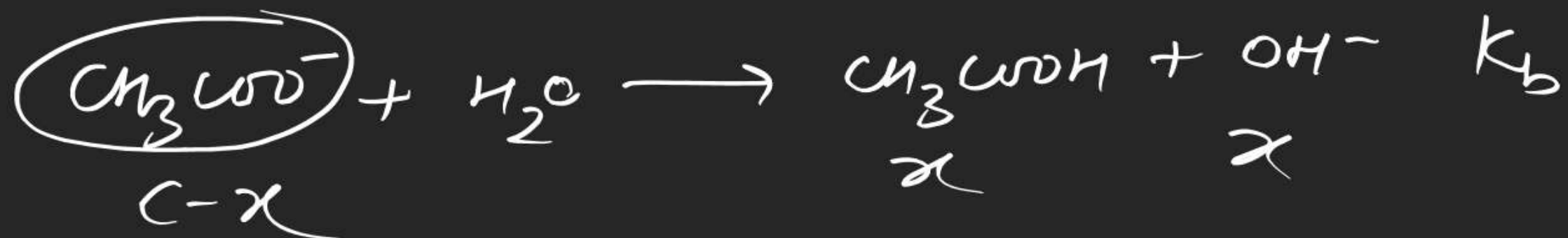


$$K_h = \frac{K_w}{K_b} = K_a = \frac{x^2}{\text{C} - x} = \frac{\text{C}h^2}{1 - h}$$

K_h hydrolysis const

h = degree of hydrolysis

Case-II Salt formed WA + SB (Basic salt)



$$K_h = \frac{K_w}{K_a} = K_b = \frac{x^2}{c-x}$$

e.g find pH, $[\text{OH}^-]$, h & K_h of 0.25 M KCN solⁿ.

Given $K_a(\text{HCN}) = 10^{-10}$ M.



$$K_h = K_b = \frac{10^{-14}}{10^{-10}} = \frac{x^2}{0.25 - x}$$

$$10^{-4} = \frac{x^2}{0.25}$$

$$[\text{OH}^-] = x = 5 \times 10^{-3}$$

$$\text{pOH} = 3 - \log 5 = 2.3$$

$$\text{pH} = 14 - 2.3 = 11.7$$

$$K_h = 10^{-4}$$

$$[\text{OH}^-] = ch$$

$$5 \times 10^{-3} = \frac{1}{4} \times h$$

$$2 \times 10^{-2} = h$$

Q. find pH of $10^{-2} \text{ M } \underline{\text{C}_6\text{H}_5\text{NH}_3\text{Cl}}$. Given $K_b(\text{C}_6\text{H}_5\text{NH}_2) = 10^{-8} \text{ M}$.

Cl^-



$$10^{-6} = \frac{10^{-14}}{10^{-8}} = \frac{x^2}{10^{-2} - x}$$

$$x^2 = 10^{-8}$$

$$[\text{H}^+] = x = 10^{-4}$$

$$\text{pH} = 4$$

3

4

9

10

Case-IV Salt formed by WA + WB



$$\frac{K_w}{K_b} = \frac{[\cancel{\text{NH}_4\text{OH}}][\text{H}^+]}{[\cancel{\text{NH}_4^+}]}$$



$$\frac{K_w}{K_a} = \frac{[\cancel{\text{HCN}}][\text{OH}^-]}{[\cancel{\text{CN}^-}]}$$



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

$$[\text{H}^+] = \sqrt{\frac{K_w K_a}{K_b}}$$

$$\text{pH} = \frac{1}{2}(\text{p}K_w + \text{p}K_a - \text{p}K_b)$$

0-I Upto 32 Ionic eg/d^m