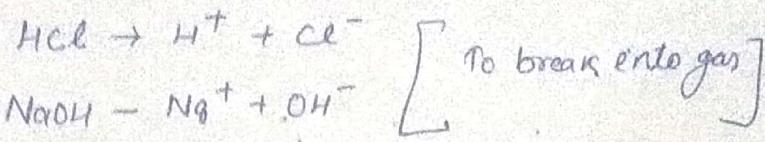


Dissociation

2017, 2020

Dissociation: Any acid or base on dissolving in water gives H^+ or OH^- .



The dissociation constant for weak acid depend on their str.

$$K \propto s^2$$

If for two weak acid dissociation constant are K_a , K_b and strength are s_1 , s_2

Then

$$\boxed{\frac{s_1^2}{s_2^2} = \frac{K_a}{K_b}}$$

(Relative str)

or

$$\boxed{\frac{s_1}{s_2} = \sqrt{\frac{K_a}{K_b}}}$$

2018

Q The dissociation constant of formic acid and acetic acid are 21.4×10^{-4} and 1.81×10^{-5} respectively. find the relative str of acid

Sol

$$K_1 \text{ or } K_a = 21.4 \times 10^{-4}$$

$$K_2 \text{ or } K_b = 1.81 \times 10^{-5}$$

$$\begin{aligned} \frac{s_1}{s_2} &= \sqrt{\frac{K_1}{K_2}} \\ &= \sqrt{\frac{21.4 \times 10^{-4}}{1.81 \times 10^{-5}}} \\ &= \sqrt{\frac{21460}{18.1}} \end{aligned} \quad \left| \begin{array}{l} \sqrt{118.23} \\ = 10.8 \text{ or } 10.9 \text{ Ans} \end{array} \right.$$

2019

Hydrolysis Constant(OH⁻)

To dissolve any acid or base salt in water.

Relation

(H⁺)

$$K_w = K_a \times K_h$$

Kw = 10⁻¹⁴

Dissociation constant

Hydrolysis Constant

$$[H^+] [OH^-] = 10^{-14}$$

VVI

2019

Calculate the hydrolysis constant of NaCN ($K_a = 1.8 \times 10^{-5}$)

Sol

$$K_w = K_a \times K_h$$

$$K_h = \frac{10^{-14}}{1.8 \times 10^{-5}} \quad \frac{K_w}{K_a}$$

$$K_h = 0.55 \times 10^{-9}$$

$$= 5.5 \times 10^{-10}$$

Ans

उसका कोडिकां पर्ही हैं Q वे

In KCN

Hydrolysis Percentage

$$h = \sqrt{\frac{K_h}{C}}$$

hydrolysis Constant

Concentration

$$K_w = K_h \times K_a$$

$$h = \sqrt{\frac{K_w}{K_a \times C}}$$

Ex find hydrolysis % age of $\left(\frac{1N}{80}\right)$ NaCN ($K_a \approx 1.3 \times 10^{-9}$)

Ans

$$h = \sqrt{\frac{K_w}{K_a \times C}}$$

$$C = \frac{1}{80}, K_w = 10^{-14}$$

Always fix

$$\therefore h = \sqrt{\frac{10^{-14}}{1.3 \times 10^{-9} \times \frac{1}{80}}}$$

$$= \sqrt{\frac{80 \times 10^{-5}}{1.3}}$$

$$= \sqrt{6.15 \times 10^{-5}}$$

$$= \sqrt{6.15 \times 10^{-6}}$$

$$= 7.8 \times 10^{-3} \text{ Ay}$$

Check

Formula

1.

$$H \text{ in } \% \text{ age} = h = \sqrt{\frac{K_w}{K_a \times C}}$$

2.

$$H \text{ in Constant} = K_w = K_a \times K_h$$

or
NaCN

3.

$$H \text{ in relative str} = \frac{S_1}{S_2} = \sqrt{\frac{K_a}{K_b}} \text{ or } \frac{K_1}{K_2}$$

Hydrolysis Constant

Acid, Box

$$K_w \rightarrow [H^+] \times [OH^-]$$

$$K_w = 10^{-14}$$

$$K_w = K_a \times K_b$$

Hydrolysis
Constant

$$= 10^{-14}$$

Dissociation
constant

D
Hydrolysis Constant K_h ?

$$K_w = K_a \times K_b$$

$$10^{-14} = 1.8 \times 10^{-5} \times K_h$$

$$K_h = \frac{10^{-14}}{1.8 \times 10^{-5}}$$

$$\approx 0.55 \times 10^{-9}$$

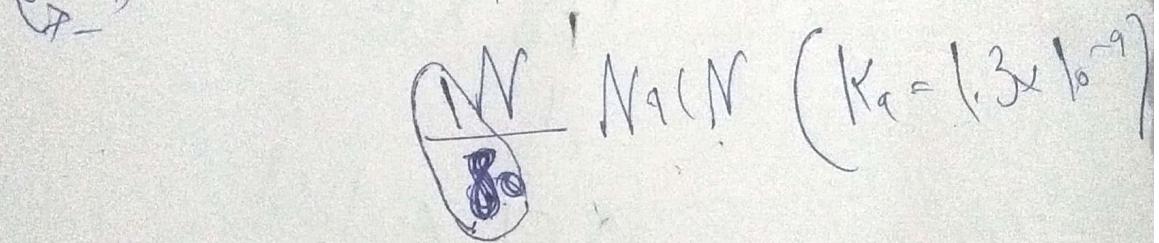
$$\underline{\underline{5.5 \times 10^{-10}}}$$

Hydrolysis %age

$$h = \sqrt{\frac{K_h}{C}} \quad \text{Hydrolysis %age}$$

↓
Concentration

Eg., find hydrolysis %age of



$$K_w = K_a + K_h$$

$$10^{-14} = 1.3 \times 10^{-9} + K_h$$

$$K_h = \frac{10 \times 10^{-14}}{1.3 \times 10^{-9}}$$

$$= 0.77 \times 10^{-5}$$

$$\frac{h^2}{2} \sqrt{\frac{K}{C}}$$

$$= \frac{0.77 \times 10^{-5}}{\frac{1}{80}}$$

$$= \frac{0.77 \times 80 \times 10^{-5}}{1}$$

$$= 6.16 \times 10^{-4}$$

$$= 2.48 \times 10^{-2}$$

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