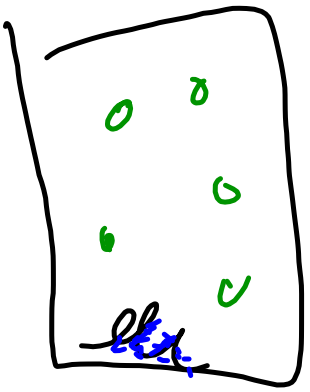


$K_p = P_{CO_2}$

$CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$

$15.00\,g\,CaCO_3$ K_p is given

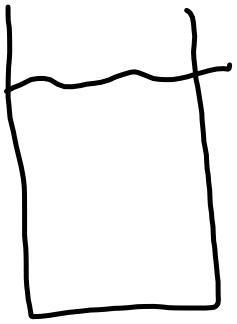
What % of the $CaCO_3$ decomposes?

$$\text{PERCENT} = 100\% \left(\frac{\text{PART}}{\text{WHOLE}} \right)$$

$PV = nRT$

$$n = \frac{PV}{RT}$$

$R = 0.08206 \frac{L\,atm}{mol\,K}$



H_2O

$$2H_2O(l) \rightleftharpoons H_3O^+_{(aq)} + OH^-_{(aq)}$$

hydronium ion

hydroxide ion

$$K_w = [H_3O^+]_{eq}[OH^-]_{eq}$$

$$= 1.0 \times 10^{-14}$$

at 25°C

$$2H_2O(l) \rightleftarrows H_3O^+(aq) + OH^-(aq)$$

	$[H_3O^+]$	$[OH^-]$
I	0	0
C	$+x$	$+x$
E	x	x

$$K_w = [H_3O^+]_{eq}[OH^-]_{eq}$$

$$= (x) \cdot (x) = x^2$$

At 25°C

$$x^2 = 1.0 \times 10^{-14}$$

$$x = 1.0 \times 10^{-7} M$$

$$= 0.0000001 M$$

An ACID is a substance that produces H_3O^+ ions when dissolved in H_2O (Arrhenius)

An ACID is a proton (H^+) donor (Bronsted/Lowry)

A BASE is a substance that produces OH^- ions when dissolved in H_2O (Arrhenius)

A BASE is a proton acceptor (Bronsted/Lowry)

$$HCl(aq) + H_2O(l) \xrightarrow{\sim 100\%} H_3O^+(aq) + Cl^-(aq)$$

STRONG ACID

$$HC_2H_3O_2(aq) + H_2O \rightleftharpoons H_3O^+(aq) + C_2H_3O_2^-(aq)$$

weak acid

$$NaOH(s) \xrightarrow[100\%]{H_2O} Na^+(aq) + OH^-(aq)$$

STRONG BASE

$$NH_3(aq) + H_2O \rightleftharpoons NH_4^+(aq) + OH^-(aq)$$

weak base

$$pH = -\log[H_3O^+]_{eq}$$

$$pOH = -\log[OH^-]_{eq}$$

$$p\,anything = -\log(anything)$$

$$K_w = [H_3O^+]_e[OH^-]_e$$

$$\log K_w = \log\left([H_3O^+]_e[OH^-]_e\right)$$

$$\log K_w = \log[H_3O^+] + \log[OH^-]$$

$$-\log K_w = -\log[H_3O^+] - \log[OH^-]$$

$$pK_w = pH + pOH$$

At 25°C

$$14.00 = pH + pOH$$