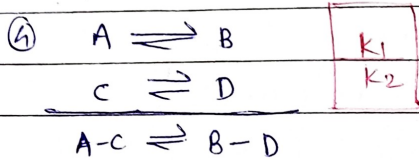
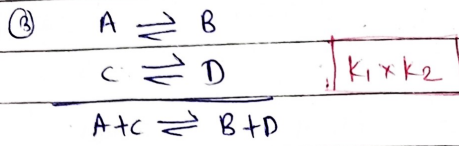
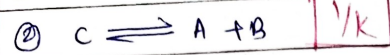
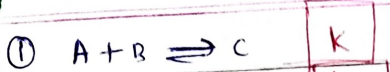
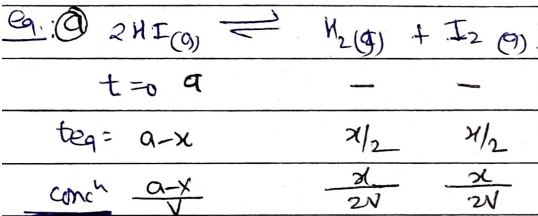


Equilibrium



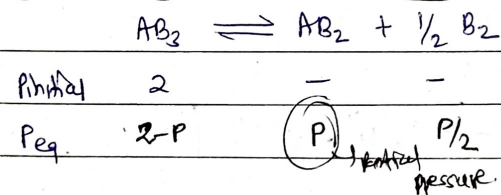
⑤ $K_p = K_c (RT)^{\Delta n_g}$



concentration

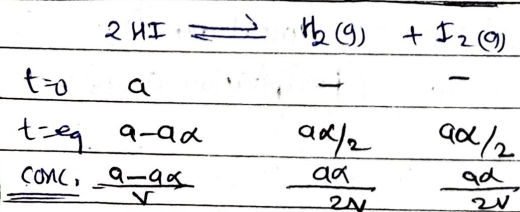
$$K_c = \frac{[H_2][I_2]}{[HI]^2}$$

⑥ Finding in terms of pressure.



$P_T = 2-P + P + P/2 \Rightarrow 2 + P/2$

⑦ K_c in terms of Degree of Dissociation.



$$K_c = \frac{[H_2][I_2]}{[HI]^2}$$

⑧ Reaction Quotient (Q).

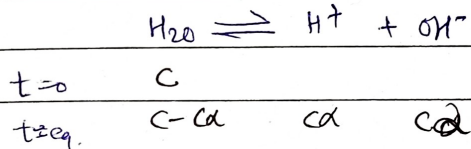
→ Application of rxn quotient

- ① $Q_c = K_c$ (equilibrium)
- ② $Q_c > K_c$ (backward dirn)
- ③ $Q_c < K_c$ (forward dirn)

$$\log \frac{K_2}{K_1} = \frac{\Delta H}{2.303 R} \left[\frac{T_2 - T_1}{T_1 T_2} \right]$$

Ionic equilibrium

① Ionic product



② Acids in pure water.

when we have to neglect water conc. 10^{-7}

- ① 10^{-5} or 10^{-6} neglect 10^{-7} (water)
- ② 10^{-9} or 10^{-8} neglect conc. of Acid
- ③ 10^{-6} or 10^{-8} (take average)

- ① strong acid in pure water
 - ② strong base in pure water
- } only for valid strong acids (base in water)

③ Weak acid in water

$K_a = C\alpha^2$
 $(\alpha = \alpha)$

$\alpha < 0.05$ (neglect)
$\alpha > 0.05$ (count)

a) $K_a = C\alpha^2$

b) $[H^+] = C\alpha$ $pK_a = -\log \alpha$

c) $[H^+] = \sqrt{K_a C}$

$pH = \frac{1}{2} pK_a - \log C$ (acid)

$pOH = \frac{1}{2} pK_b - \log C$ (base)

- ① Arrhenius H^+ & OH^- इकाई
- ② Bronsted-Lowry H^+ & OH^- इकाई
- ③ Lewis acid e^- pair (acid) & e^- pair (base)

Mixing of two strong acids or
Mixing of two strong bases.

$$[H^+] = \frac{M_1 V_1 n_1 + M_2 V_2 n_2}{V_1 + V_2}$$

$$[H^+] = \frac{\text{Total moles}}{\text{Total Volume}}$$

Salt Hydrolysis

⇒ valid for only conjugate acid & base pair

$$K_w = K_a \times K_b$$

$$pK_w = pK_a + pK_b$$

- If strong cation or strong anion of strong acid or base H^+ or OH^- hydrolysis does not involve water.

$$K_h = c \alpha^2 \quad \text{like} \quad K_c = c \alpha^2$$

$K_h = \frac{K_w}{K_a}$	$h = \sqrt{\frac{K_h}{c}}$	$K_h = c \alpha^2$
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① $W.A + S.B$: $pH = \frac{1}{2} (pK_w + pK_a + \log c)$

② $S.A + W.B$: $pH = \frac{1}{2} (pK_w - pK_b - \log c)$

③ $W.A + W.B$: $pH = \frac{1}{2} (pK_w + pK_a - pK_b)$

Buffer solⁿ

① Acidic Buffer

Weak acid + salt of W.A & strong base

② Basic Buffer

Weak base + salt of W.B & strong acid

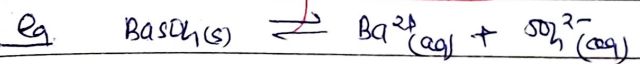
① Acidic Buffer

$$[H^+] = K_a \frac{[\text{acid}]}{[\text{salt}]}$$

② Basic Buffer

$$[OH^-] = K_b \frac{[\text{base}]}{[\text{salt}]}$$

Solubility product # (K_{sp})



$$K_{eq} = [Ba^{2+}][SO_4^{2-}]$$

$[BaSO_4]$

$$K_{sp} \times [BaSO_4] = [Ba^{2+}][SO_4^{2-}]$$

$$K_{sp} = [Ba^{2+}][SO_4^{2-}]$$

$$K_{sp} = x^x \cdot y^y \cdot s^{x+y}$$

concept of precipitation

- ① $K_{ip} = K_{sp}$ (solute is saturated)
- ② $K_{ip} < K_{sp}$ (unsaturated)
- ③ $K_{ip} > K_{sp}$ (precipitation occurs)