Equilibrium Constant For Ionic Equilibrium

Ionic equilibrium involve ions in aqueous solutions

Only K_c is considered

Note : no meaning of K_P

Different notation

K_a K_b K_w K_{sp} etc.

✓ Kc Kp Kx

Kh KIn

T dependent

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

$\Delta H = +ve$ $\rightarrow K_2 > K_1$ — F

$T_2 > T_1$

$T_2 < T_1$ $K_2 < K_1$ — B

$\Delta H = -ve$ $K_2 < K_1$ — B

$T_2 > T_1$

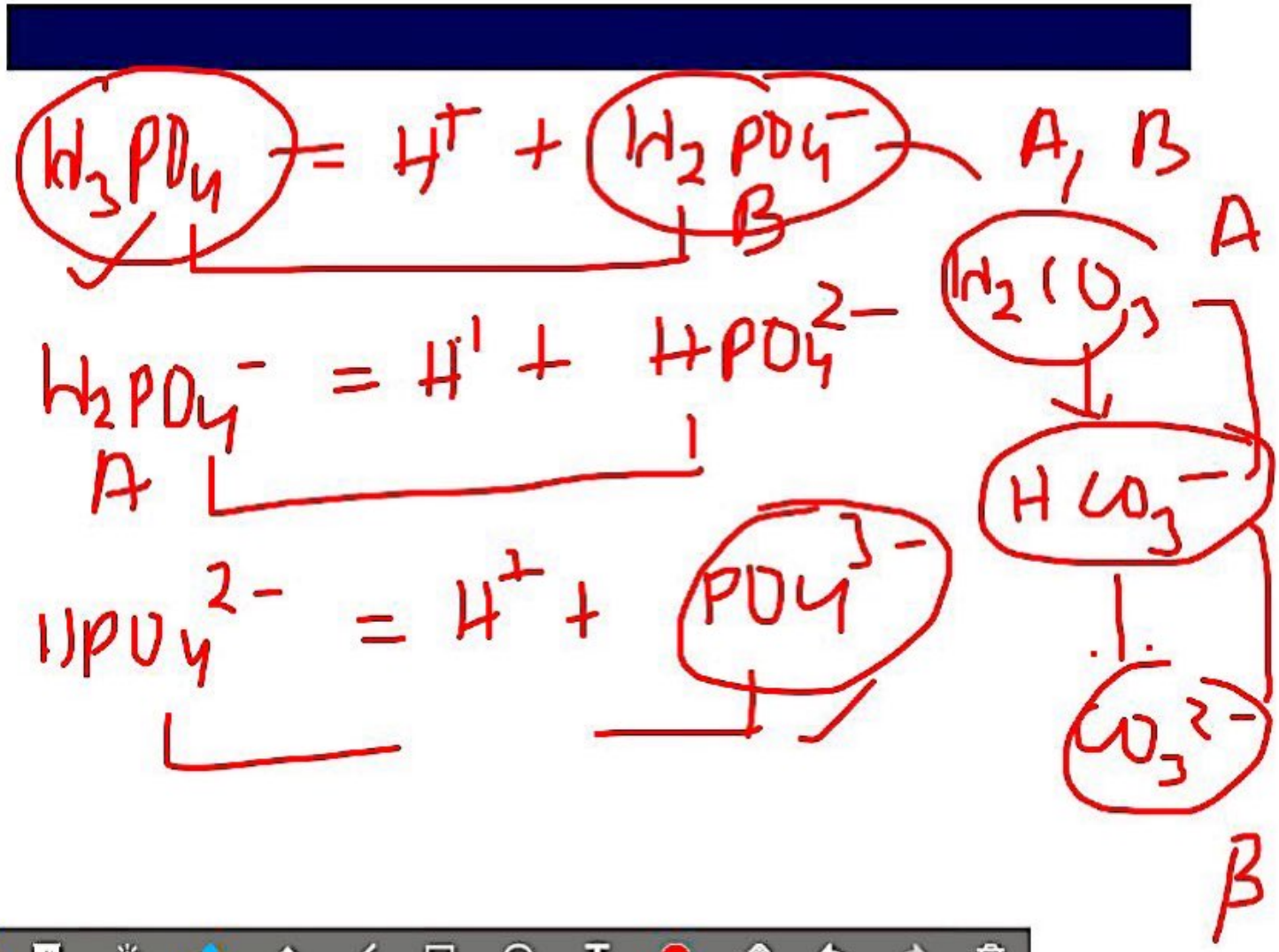
Whiteboard Spotlight Pen Highlighter Line Rectangle Oval Text Color Eraser Undo Redo Clear

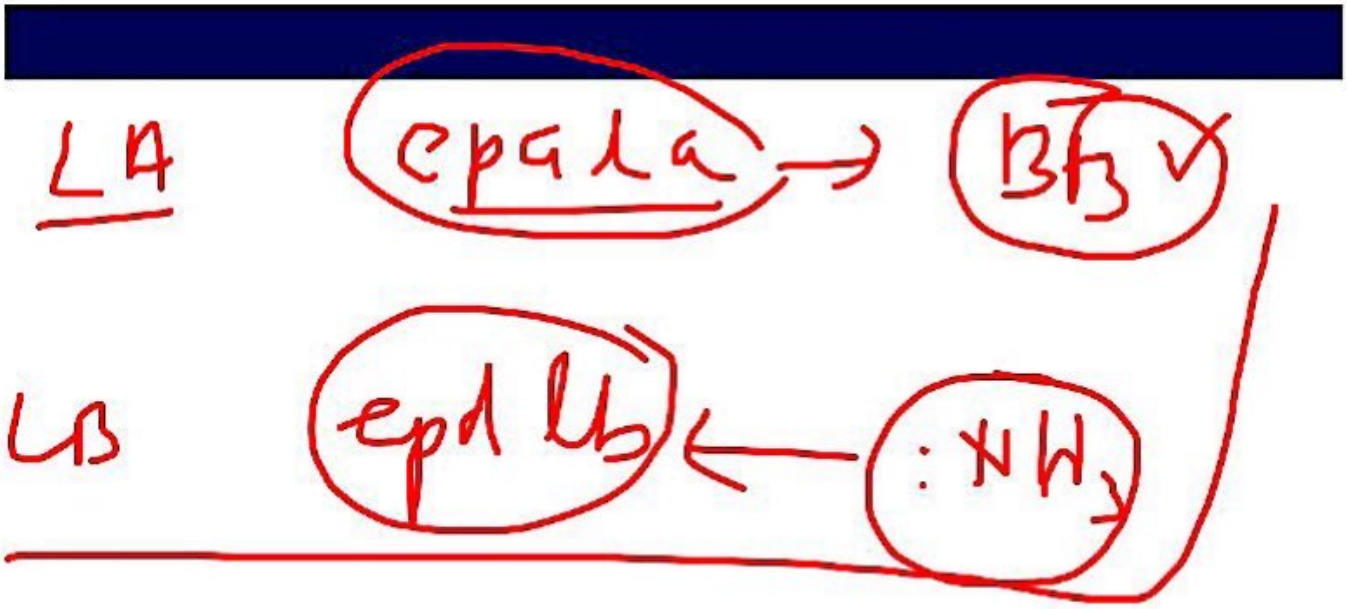
WA $K_a = \frac{C\alpha^2}{1-\alpha}$ $\alpha << 0.1$ $K_a = C\alpha^2$

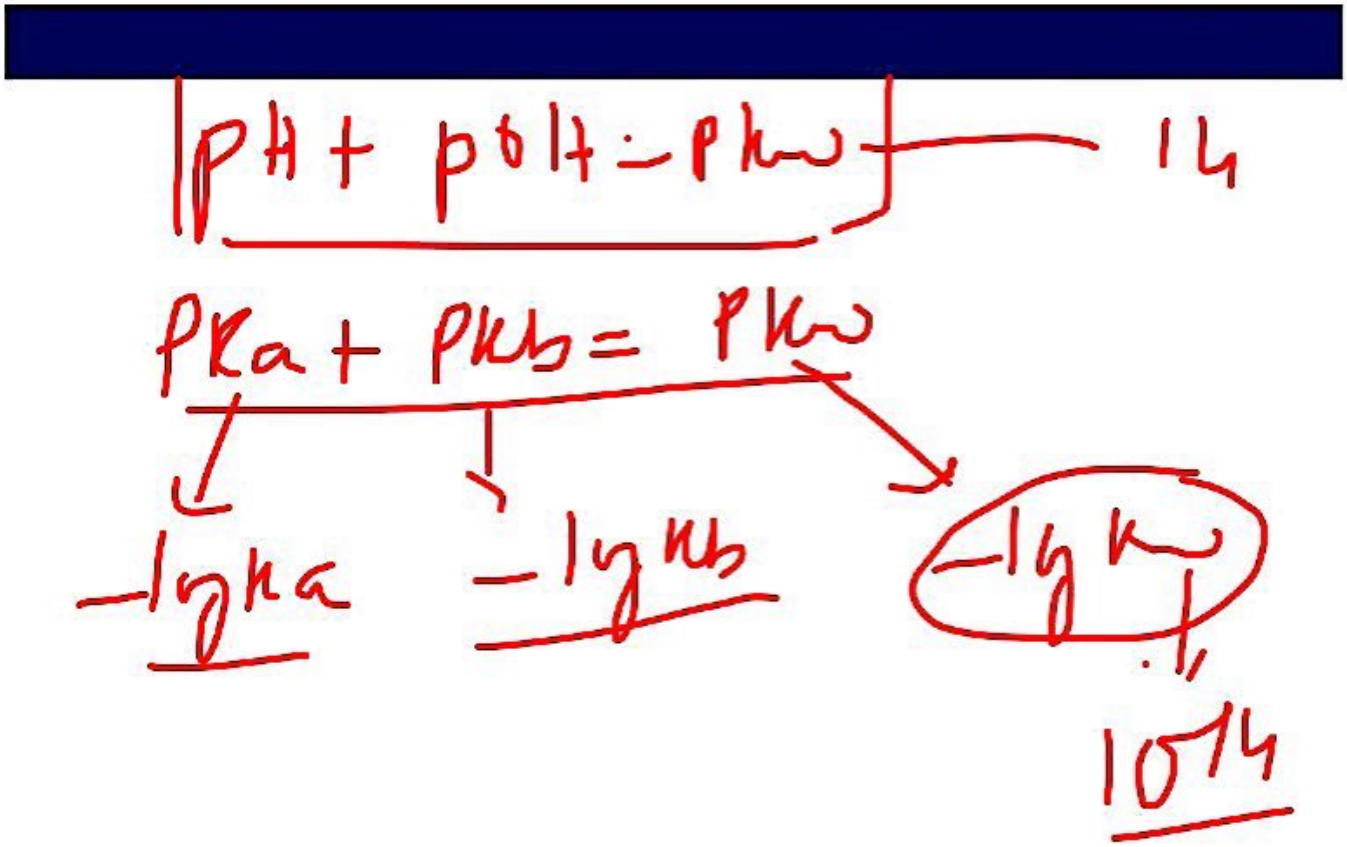
$\alpha = \sqrt{\frac{K_a}{C}}$

$pH = -\log C\alpha$ $pH = -\log\sqrt{K_a C}$

$pOH = -\log C\alpha$ $pOH = -\log\sqrt{K_b C}$







$K_w = 10^{-14}$ $(T = 25^\circ C)$

$K_w > 10^{-14}$ $T > 25^\circ C$

$K_w < 10^{-14}$ $T < 25^\circ C$

$CH_3COOH / CH_3COONa / HCOOH$

$H_2CO_3 \rightarrow HCO_3^- \rightarrow CO_3^{2-}$ — $HCOONa$

$H_3PO_4 \rightarrow H_2PO_4^- \rightarrow HPO_4^{2-} \rightarrow PO_4^{3-}$

Buffer Capacity

$$buffer\ capacity = \frac{number\ of\ moles\ of\ acid/alkali\ added\ per\ litre}{change\ in\ pH}$$

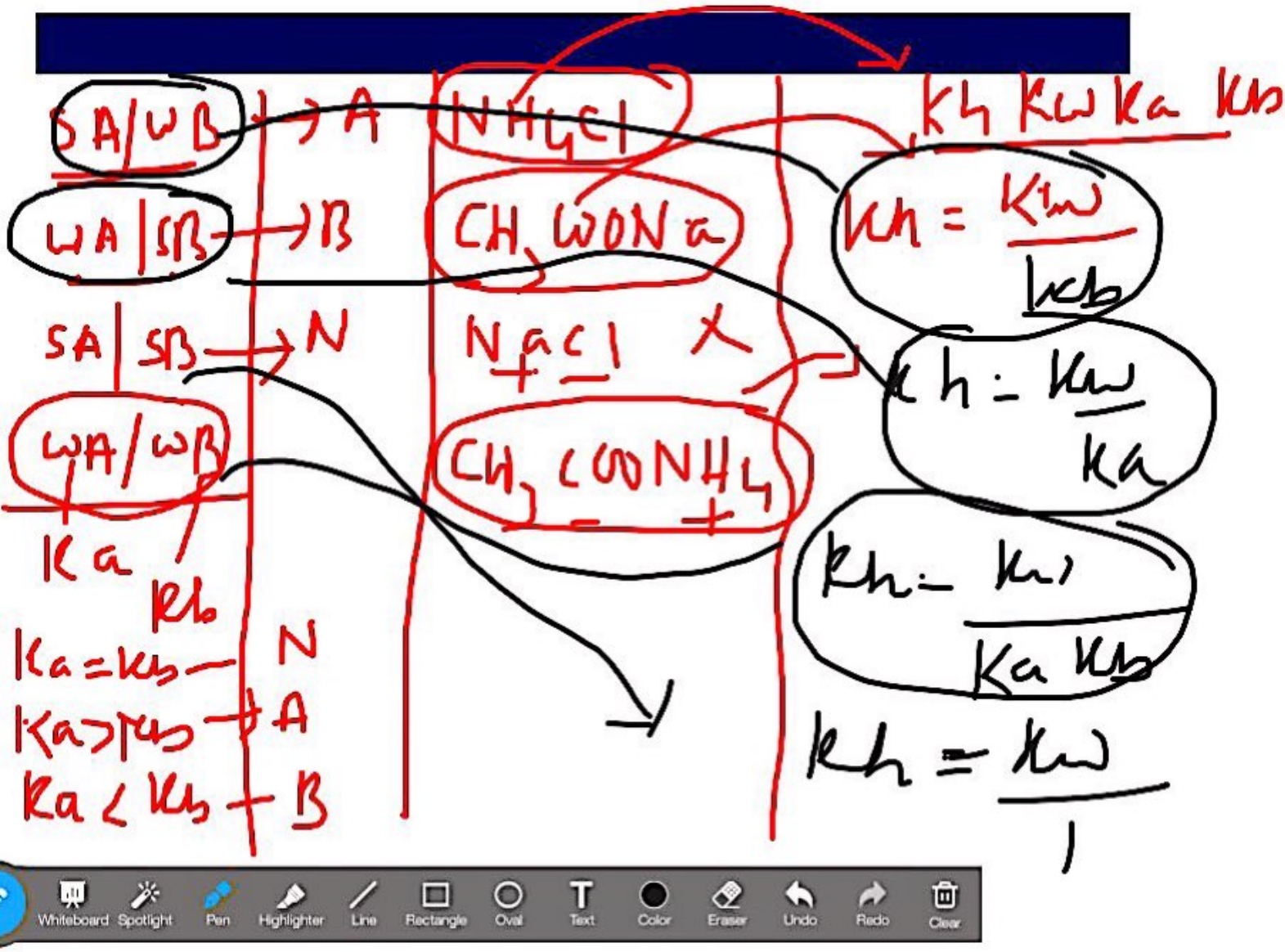
For maximum buffer capacity ➡ $\frac{[salt\ ]}{[acid]}$ or $\frac{[salt]}{[base]} = 1$

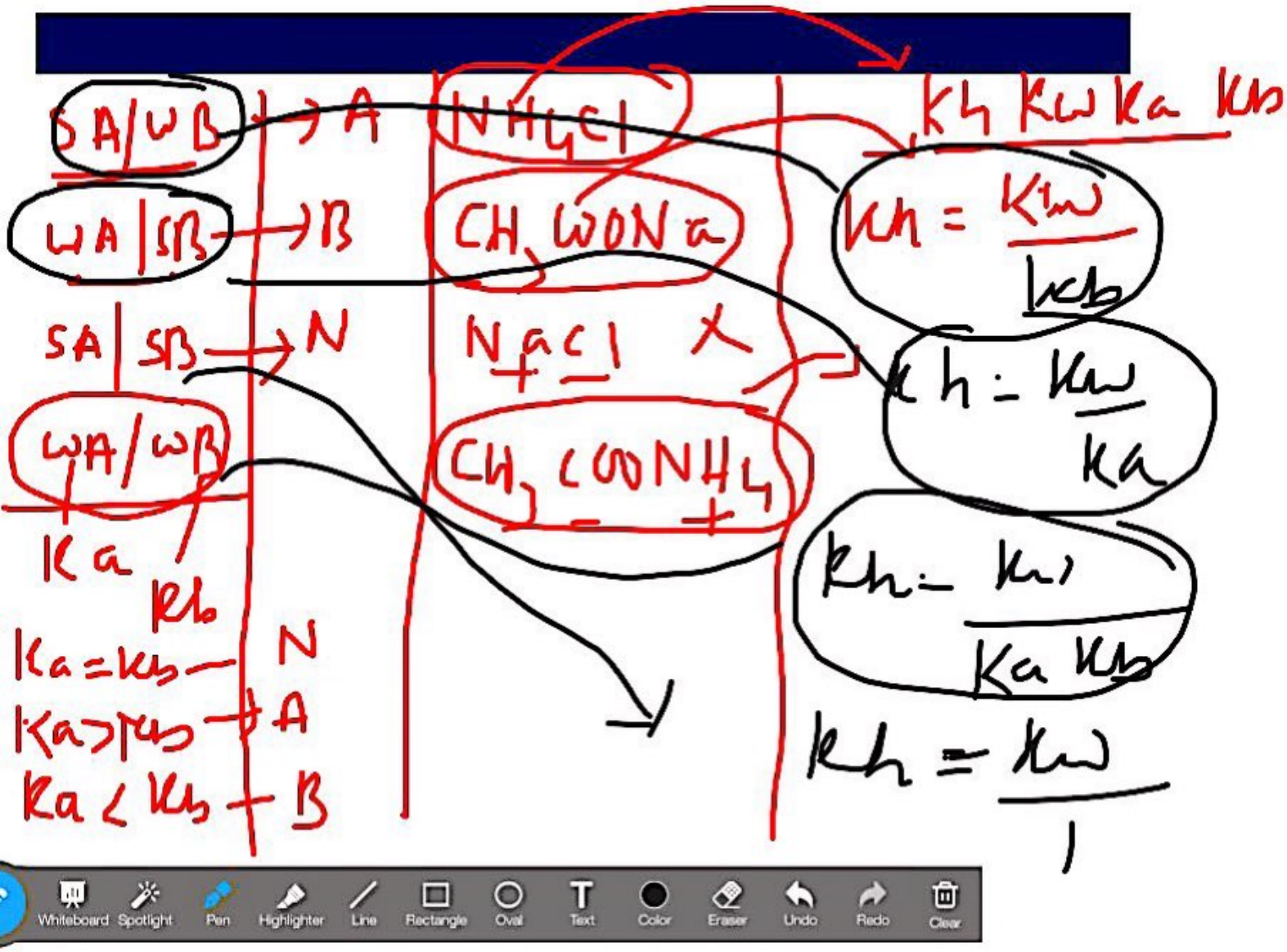
i.e. $K_a \approx [H^+]$ or $K_b \approx [OH^-]$

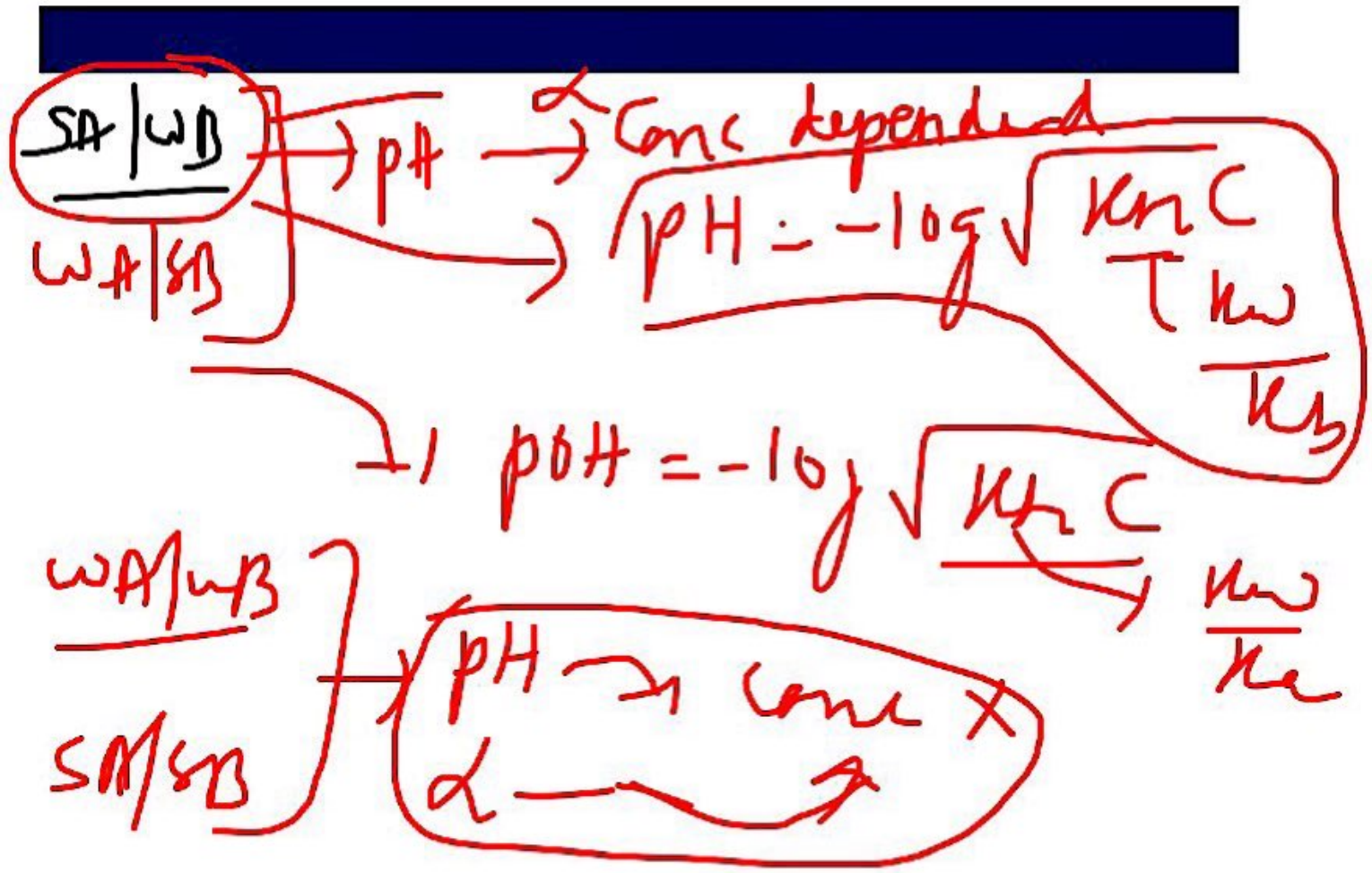
pH :— pKa BD ✓

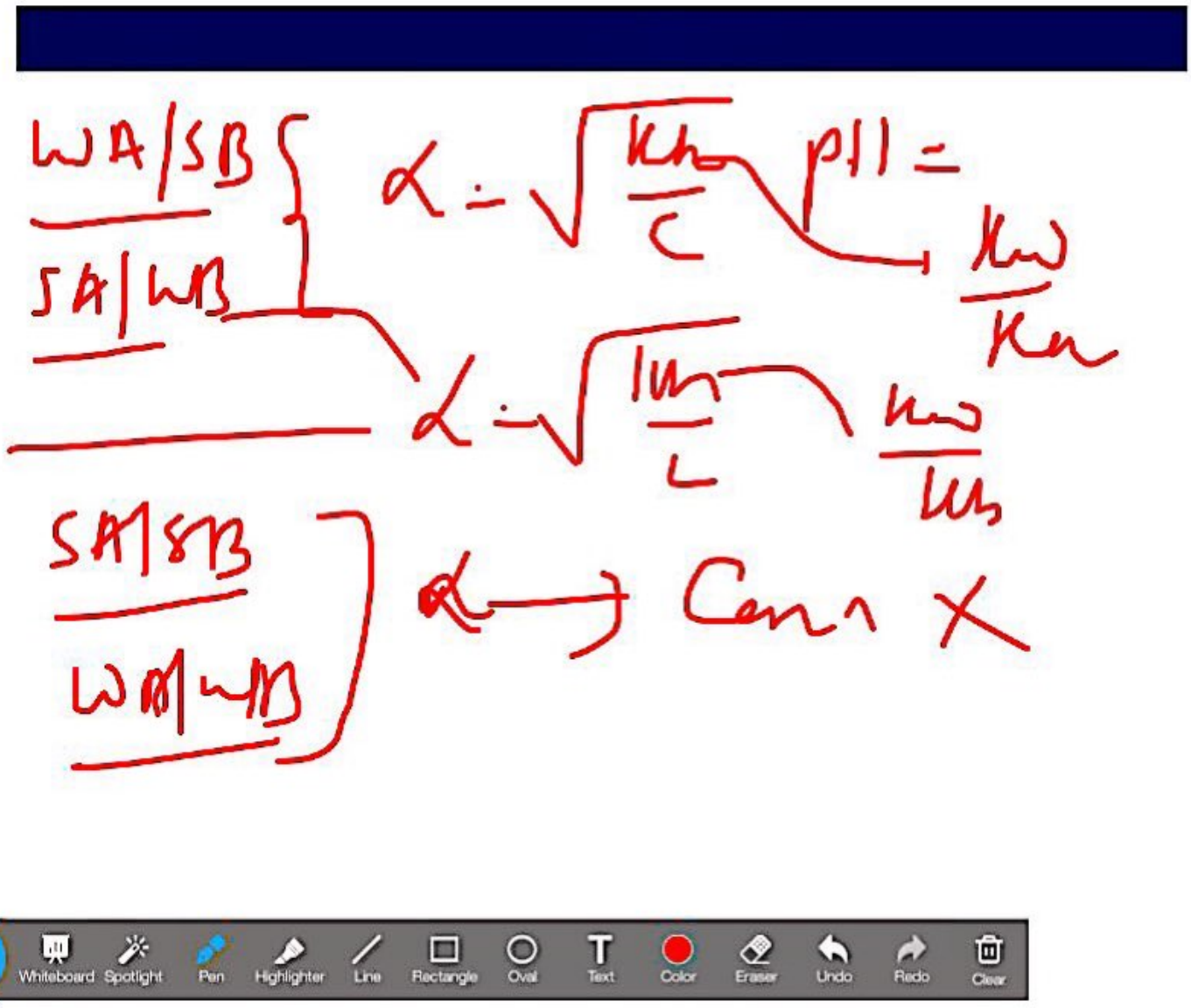
Buffer solution has lost its usefulness when one component of buffer pair is less than about 10% of other

pH :— pKa ± 1



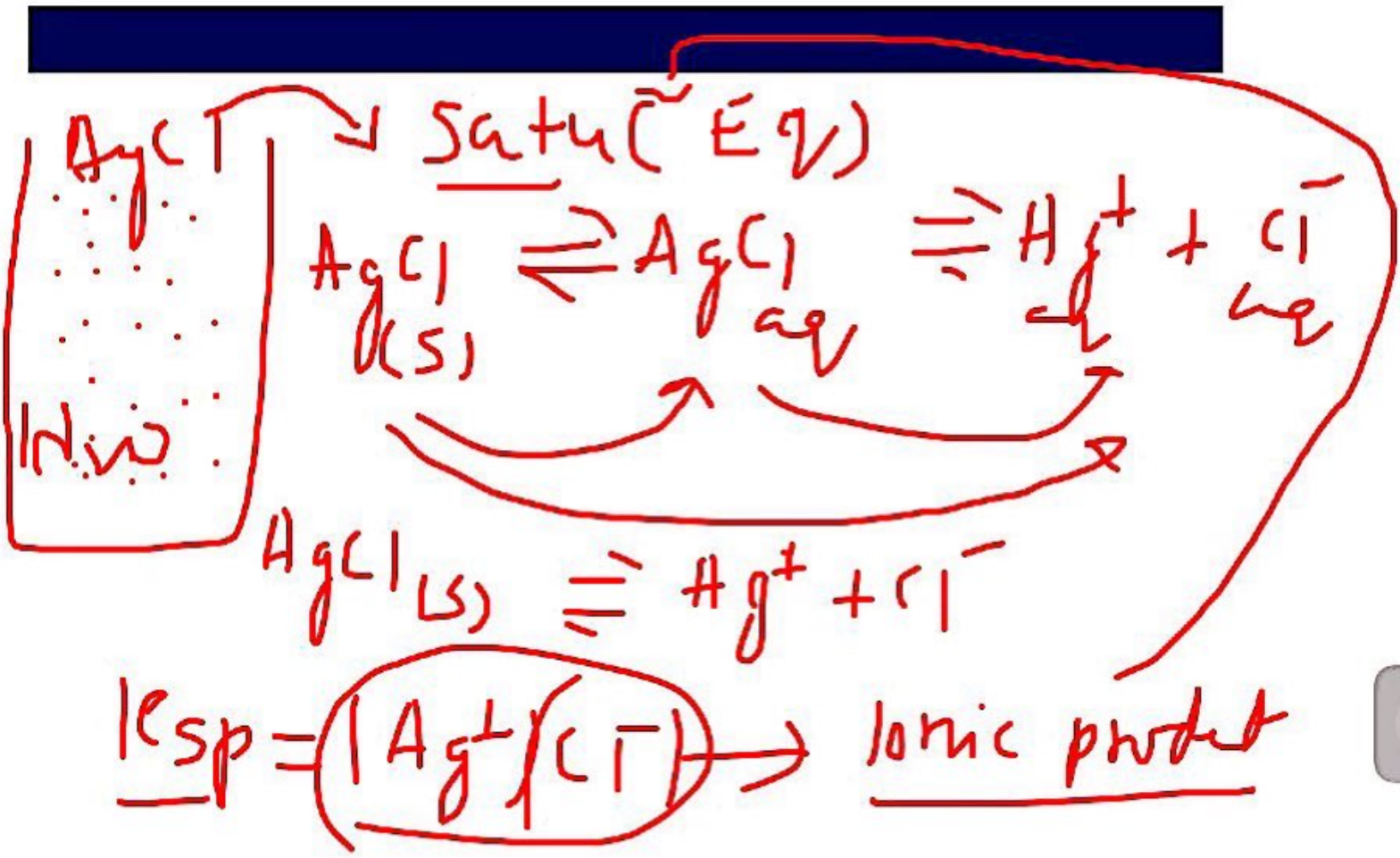






$HCl + NaOH \rightarrow NaCl + H_2O$

Salt + WATER → ΔH :- tve



$HIn \rightleftharpoons H^+ + In^-$

Bf ⟵ ⟶ Bf

$pH = pKIn$

$K_{In} = \frac{(H^+)(In^-)}{[HIn]}$

$pH = pKIn \pm 1$

$pH = pKIn + \log\left[\frac{In^-}{HIn}\right]$