$$[Na^+] = C_S + C_b^*$$

$$[H_3O^+] + [Na^+] = [OH^-] + [A^-]$$

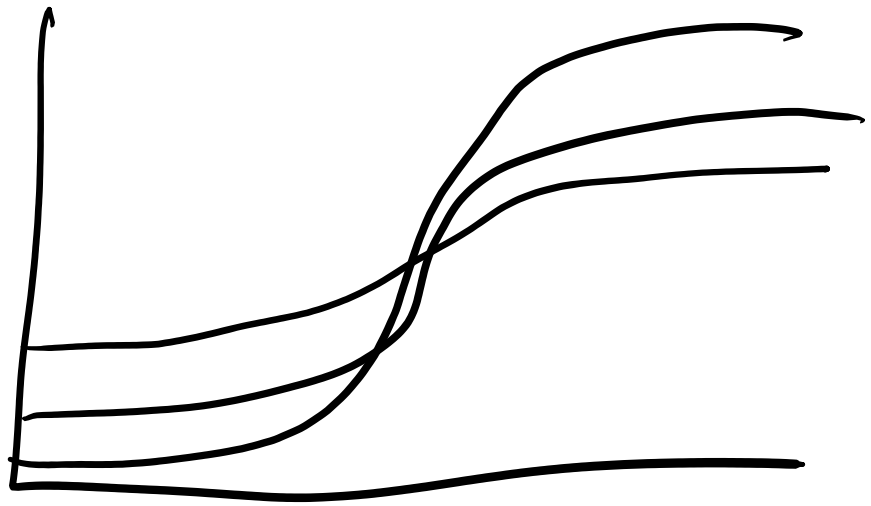
$$[OH^-] \simeq [OH^-] - [H_3O^+] = [Na^+] - [A^-] = C_S + C_b^* - [A^-]$$

C_S

$$\Downarrow$$

$$[OH^-] \simeq C_b^* = \frac{C_b V_b - C_a V_a}{V_a + V_b} \simeq \frac{C_b (V_b - V_{eq})}{V_{tot}}$$

$$[H_3O^+] = \frac{k_w}{[OH^-]}$$



Ca Ac. forte

Ca, Ka Ac. debole

AC. FORTE $C_a \geq 10^{-6} M$ BASE FORTE $C_b \geq 10^{-6} M$

AC. DEBOLE $C_a K_a \geq 10^{-8} / 10^{-7}$ BASE DEBOLE $C_b K_b \geq 10^{-4} / 10^{-7}$

$$\begin{cases} H_2A + OH^- \rightleftharpoons HA^- + H_2O \\ HA^- + OH^- \rightleftharpoons A^{2-} + H_2O \\ \vdots \end{cases}$$

H_3F

H_4C

$H_2A + H_2O = HA^- + H_3O^+$ K_{a_1}

$HA^- + H_2O = A^{2-} + H_3O^+$ K_{a_2}

K_{a_1} K_{a_2} K_w

$C_a = [H_2A] + (HA^-) + (A^{2-})$

$*[HA^-] + 2[A^{2-}] + [OH^-] = [H_3O^+]$

$\Downarrow$ (II)

$*\quad [H_3O^+] = [HA^-] + 2[A^{2-}] + [OH^-]$

I) pH Soluciones

II) Punto Vep,

III) Vep,

IV) $V_{ep_1} < V_T < V_{ep_2}$

V) V_{ep_2}

VI) $V_T > V_{ep_2}$

$H_2A + 2H_2O \rightleftharpoons A^{2-} + 2H_3O^+$ $\quad K = K_{a1} K_{a2} = \dfrac{[H_3O^+]^2 [A^{2-}]}{[H_2A]}$

$[A^{2-}] = [H_2A] \dfrac{K_{a1} K_{a2}}{[H_3O^+]^2}$

$HA^- + H_2O \rightleftharpoons H_2O + OH^-$ $\quad K_{b2} \propto K_{a1}$

$HA^- + H_2O \rightleftharpoons A^{2-} + H_3O^+$ $\quad K_{a2}$

$K_a K_b = K_w$

$K_{a2} K_{b1} = K_w$

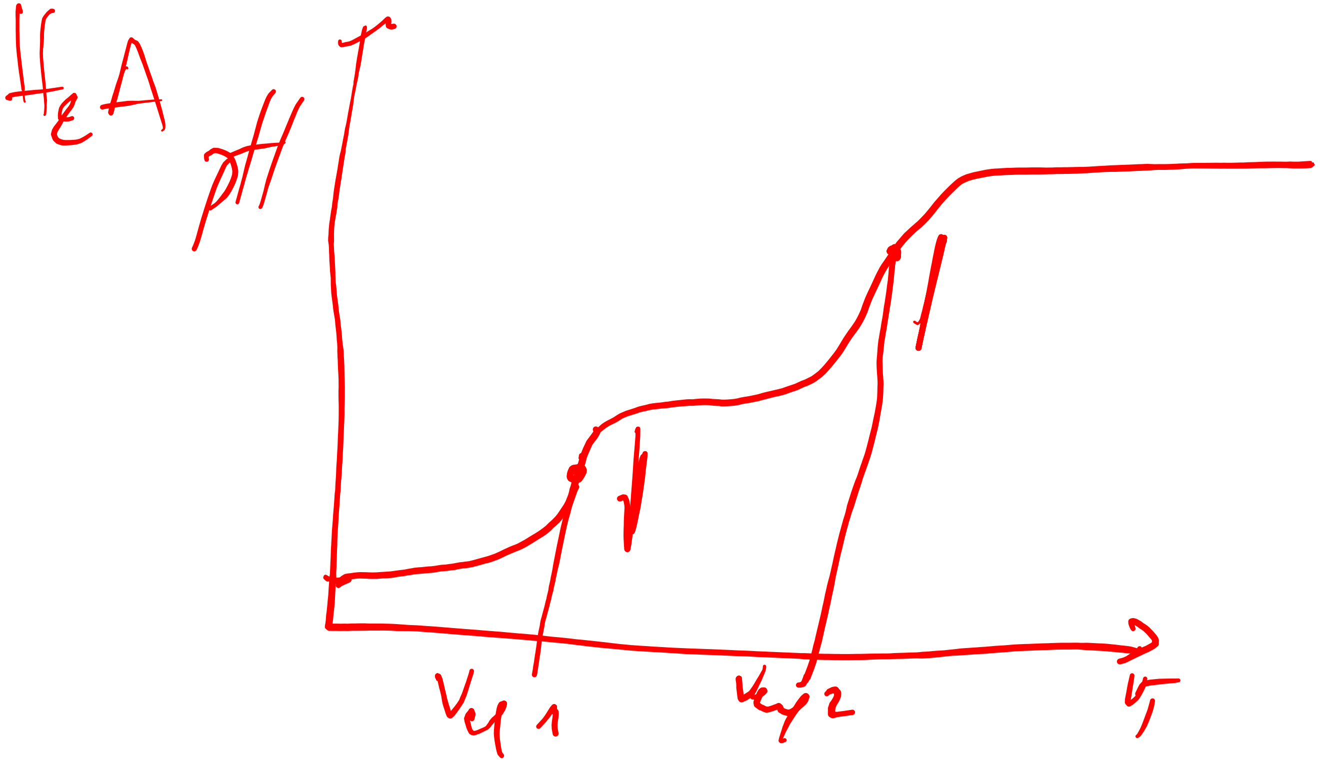
$K_{a1} K_{b2} = K_w$

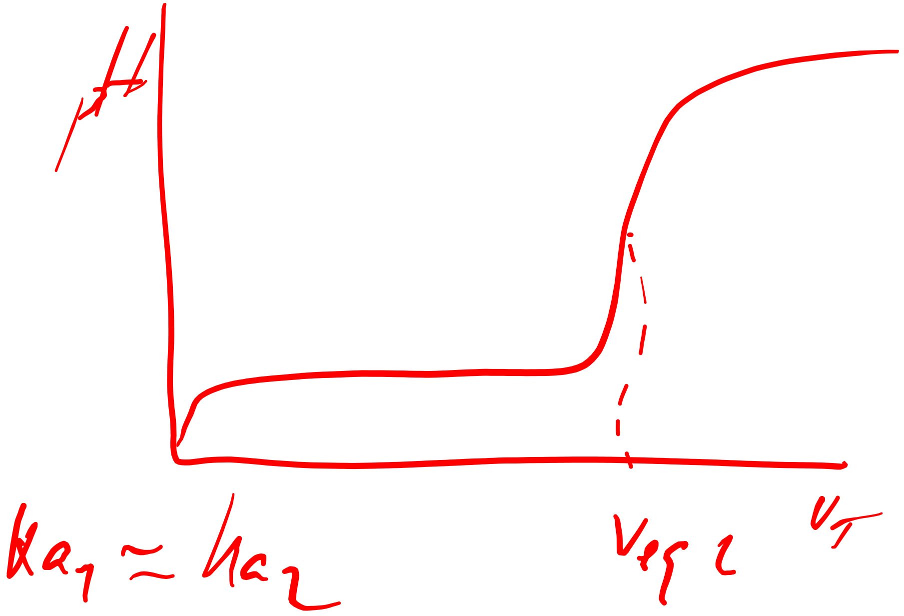
$H_2A + OH^- \rightleftharpoons HA^- + H_2O$

K_{a1} K_{a2} (K_c^+)

$\alpha^* = \frac{C_a V_a}{V_a + V_b} = \frac{C_b V_b}{V_a + V_b}$ C.P.

$[H_2A] + [H_3O^+] = [A^-] + [OH^-]$





i) calcola pH ?

ii) quali protoni sono titolabili ?

$K_a C_a \geq 10^{-8}$

$K_{a_i} C_a \geq 10^{-8}$

$\frac{K_{a_i}}{K_{a_{i+1}}} \geq 10^4$