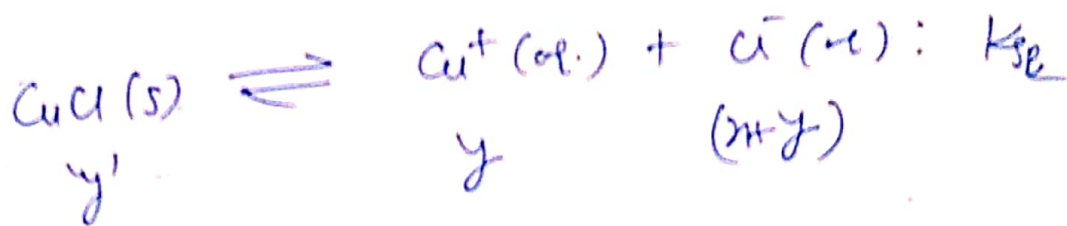
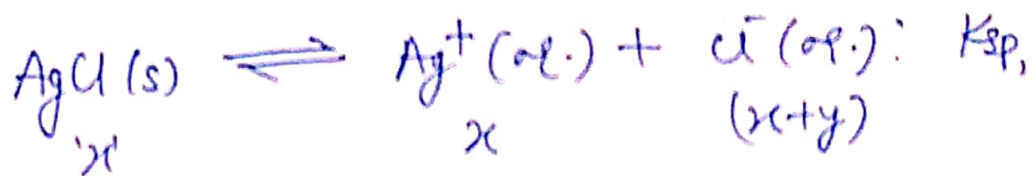


①



$$K_{sp1} = x(x+y) \dots \text{①}$$

$$K_{sp2} = y(x+y) \dots \text{②}$$

$$\begin{aligned} \text{①} + \text{②} \Rightarrow (x+y) &= \sqrt{K_{sp1} + K_{sp2}} = \sqrt{1.6 \times 10^{-10} + 10^{-6}} \\ &= \sqrt{10^{-6}} = 10^{-3} \text{ M} \end{aligned}$$

$$\begin{aligned} \text{from eqn. ①} \Rightarrow [\text{Ag}^+] = x &= \frac{K_{sp1}}{(x+y)} = \frac{1.6 \times 10^{-10}}{10^{-3}} \\ &= 1.6 \times 10^{-7} \text{ M} \end{aligned}$$

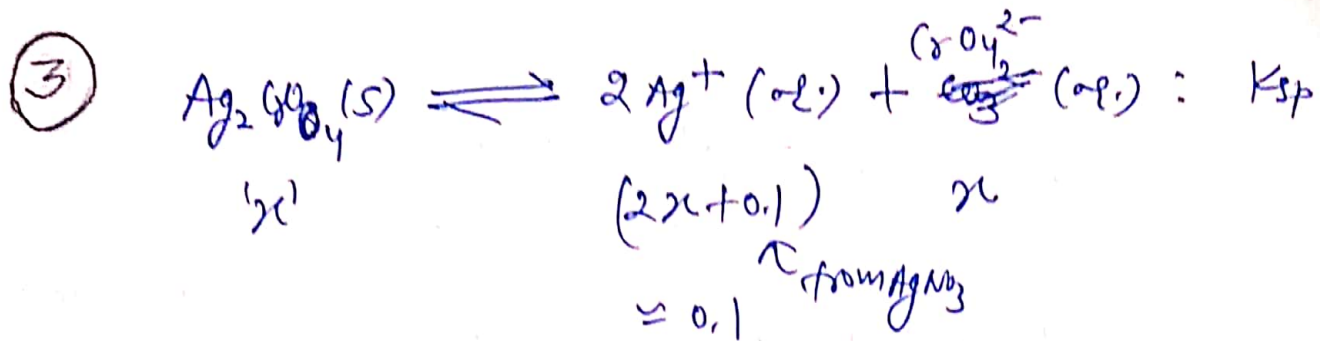
②

$$\gamma = K [\text{H}^+] [\text{ester}] \Rightarrow \gamma \propto [\text{H}^+]$$

$$\frac{\gamma_{\text{W.A.}} (\text{HA})}{\gamma_{\text{S.A.}} (\text{HX})} = \frac{[\text{H}^+]_{\text{HA}}}{[\text{H}^+]_{\text{HX}}} = \frac{1}{100} \quad (\text{given})$$

$$\frac{[\text{H}^+]_{\text{HA}}}{1} = \frac{1}{100} \Rightarrow [\text{H}^+]_{\text{HA}} = x = 10^{-2}$$

$$K_a = \frac{x^2}{(1-x)} = \frac{(10^{-2})^2}{1-10^{-2}} = 10^{-4}$$



$$K_{sp} = (\text{Ag}^+)^2 [\text{CrO}_4^{2-}]$$

$$1.1 \times 10^{-12} = (0.1)^2 (x)$$

$$x = 1.1 \times 10^{-10} \text{ M}$$

④ $|\Delta H| \times \text{gm equivalent neutralised} = (C_{\text{calorimeter}} + \cancel{C_{\text{soln.}}}) \Delta T$

$V \times d \times \text{sp. heat}$

Expt. - 1

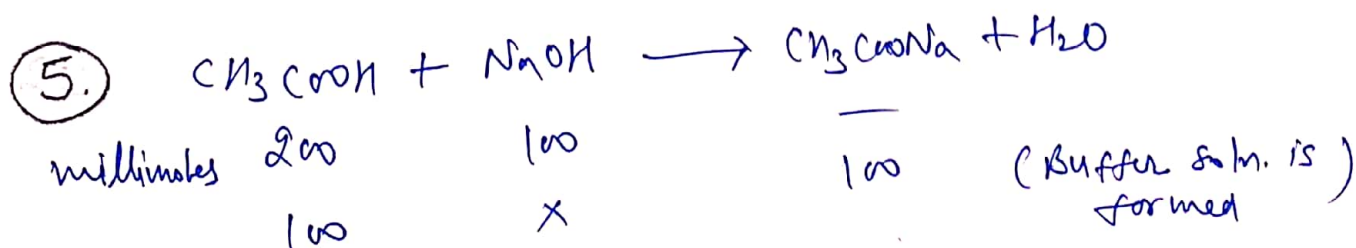
$$57 \times \frac{1 \times 100}{1000} = [C_{\text{calorimeter}} + 200 \times 1 \times 4.2] \times 5.7 \quad \dots \textcircled{1}$$

Expt. - 2

$$|\Delta H| \times \frac{1 \times 100}{1000} = [C_{\text{calorimeter}} + 200 \times 1 \times 4.2] \times 5.6 \quad \dots \textcircled{2}$$

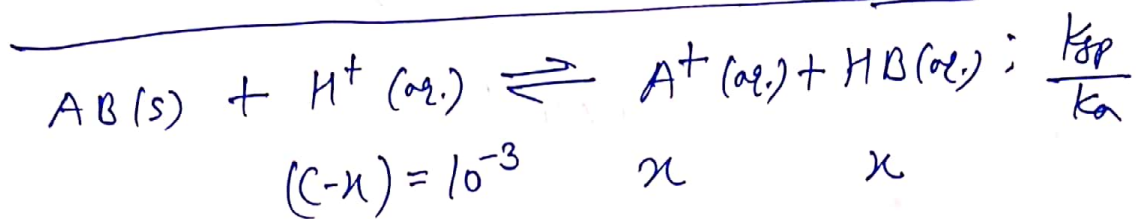
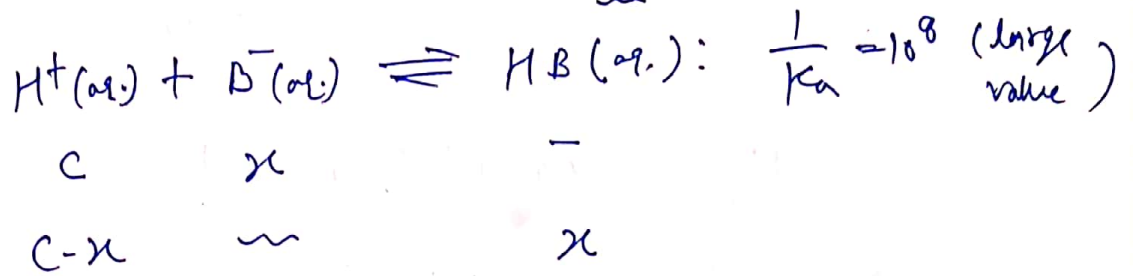
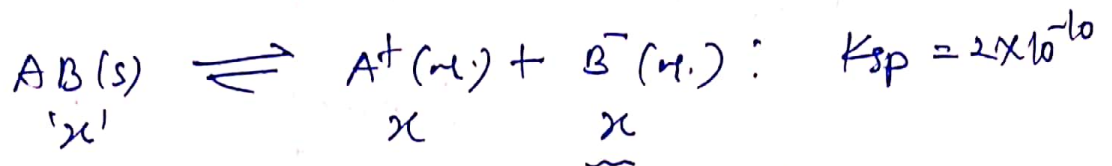
eqn. $\frac{\textcircled{2}}{\textcircled{1}} \Rightarrow \frac{|\Delta H|}{57} = \frac{5.6}{5.7} \Rightarrow |\Delta H| = 56 \text{ KJ/mol}$

$$\Delta H_{\text{dissociation}} = 57 - |\Delta H| = 57 - 56 = 1 \text{ KJ/mol}$$



$$\text{pH} = \text{pKa} + \log \left(\frac{\text{S/A}}{\text{A}} \right) = 5 - \log 2 + \log \left(\frac{100}{100} \right) = 4.7$$

6.



$$\frac{K_{sp}}{K_a} = \frac{x^2}{10^{-3}}$$

$$x = \sqrt{\frac{K_{sp}}{K_a} \times 10^{-3}} = \sqrt{\frac{2 \times 10^{-10}}{10^{-8}} \times 10^{-3}}$$

$$= 4.47 \times 10^{-3} \text{ M}$$