

$$\text{pH} = \text{pK}_a + \log \frac{[S]}{[A]}$$

$$\log S - \log 10 = + \log \frac{V \times 5}{10 \times 2}$$

$$\frac{1}{\gamma} = \frac{V \times 5}{10 \times 2}$$

$$V = 2$$



$$a$$

$$a - a/4 = 3a/4$$

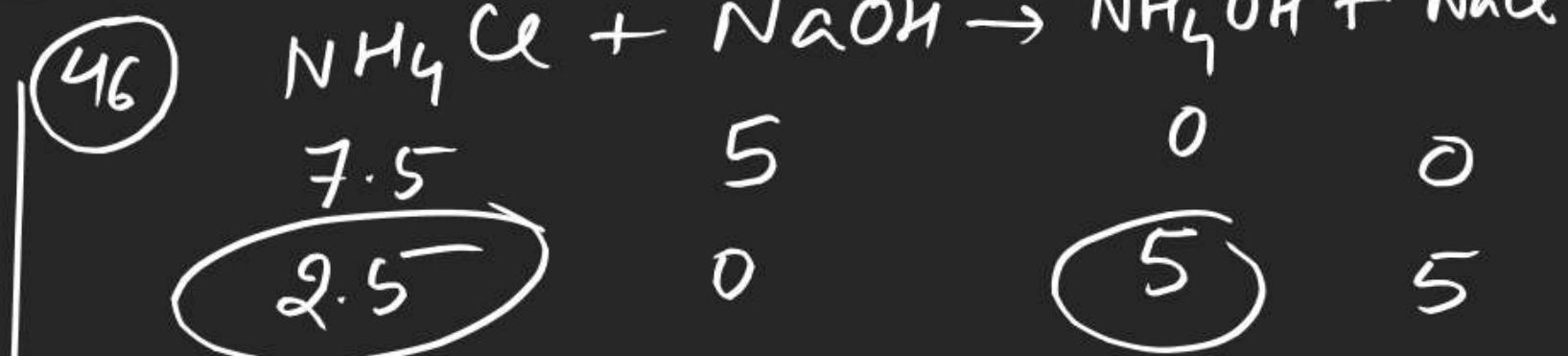
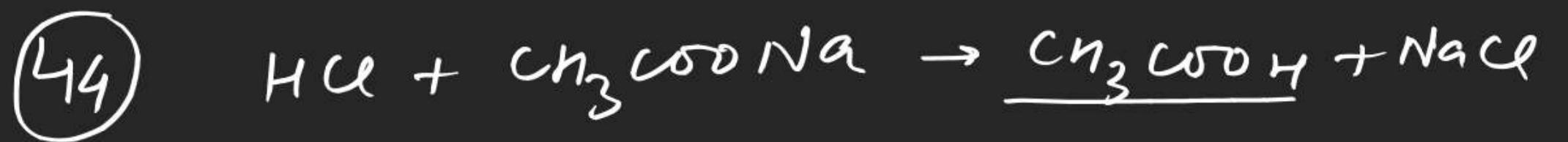
$$a/4$$

$$a/2$$

$$\text{pH} = \text{pK}_a + \log \frac{a/4}{3a/4}$$

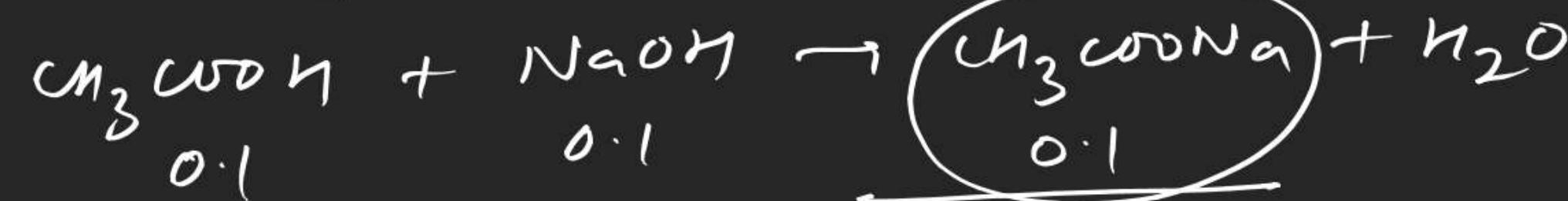
$$= \text{pK}_a + \log \frac{1}{3}$$

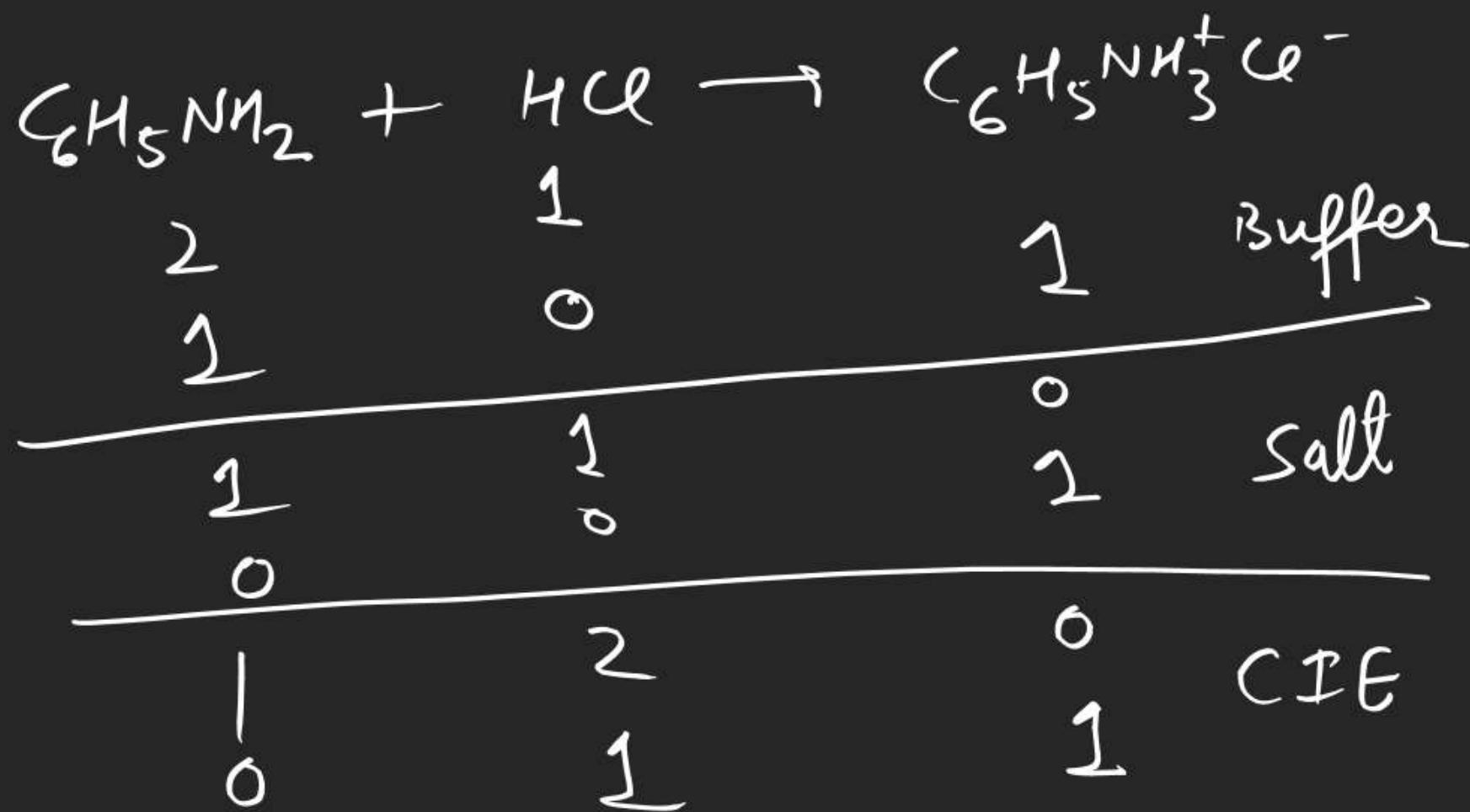
$$\text{pH} = \text{pK}_a + \log \frac{a/2}{a/2}$$

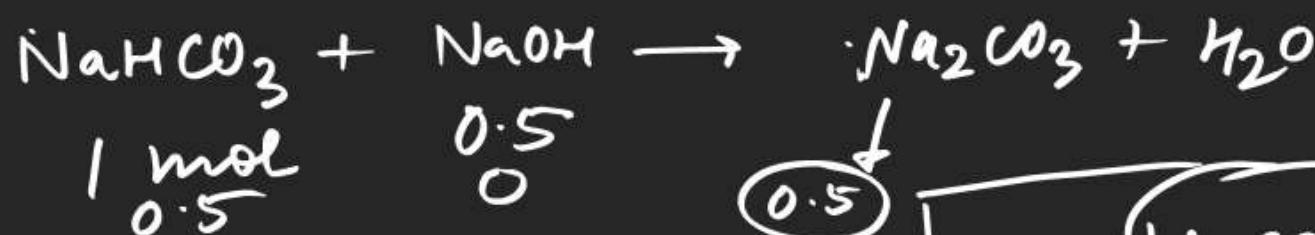


$$\begin{aligned}\text{pOH} &= \text{pK}_b + \log \frac{2.5}{5} \\ &= 4.76 + \log \frac{1}{2}\end{aligned}$$

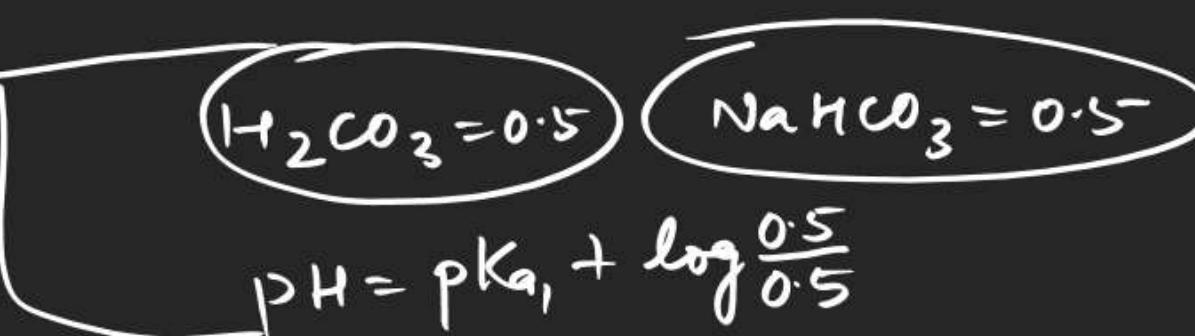
(49)

1 lit 0.2 M CH_3COONa + 1 lit 0.2 M NaOH





① 1 mol $\text{H}_2\text{CO}_3 + 0.5$ mol NaOH



② 1 mol $\text{H}_2\text{CO}_3 + 1$ mol NaOH

$$\text{pH} = \frac{1}{2}(\text{pK}_{\text{a}_2} + \text{pK}_{\text{a}_1})$$

③ 1 mol $\text{H}_2\text{CO}_3 + 1.5$ mol NaOH → Buffer

$\text{NaHCO}_3 = 0.5$ $\text{Na}_2\text{CO}_3 = 0.5$

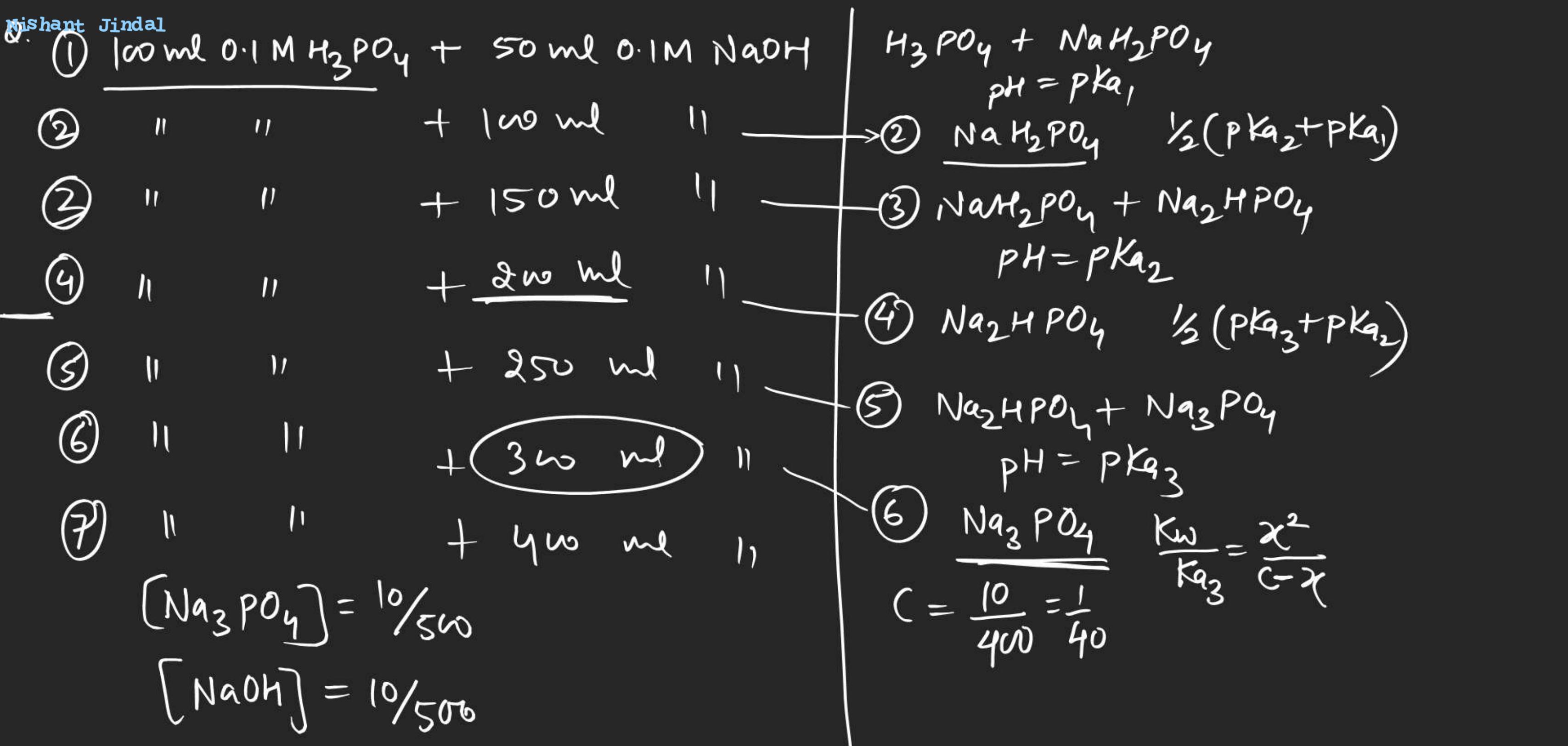
$$\text{pH} = \text{pK}_{\text{a}_2} + \log \frac{0.5}{0.5}$$

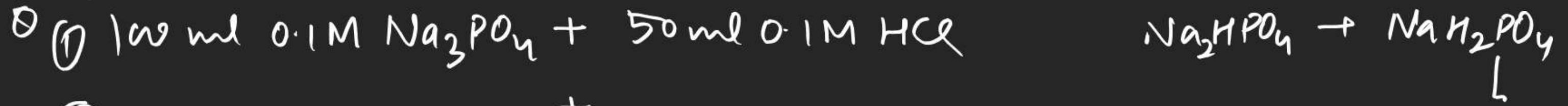
④ 1 mol $\text{H}_2\text{CO}_3 + 2$ mol NaOH → $1 \text{ mol Na}_2\text{CO}_3$ multivalent



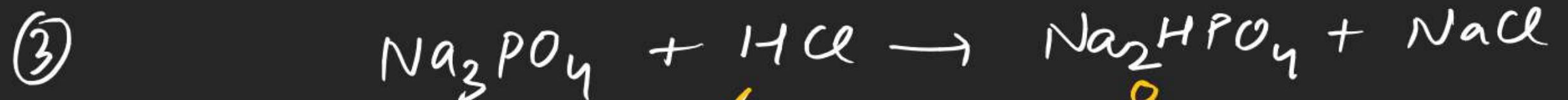
⑤ 1 mol $\text{H}_2\text{CO}_3 + 3$ mol NaOH

1 mol $\text{Na}_2\text{CO}_3 + 1$ mol NaOH





②



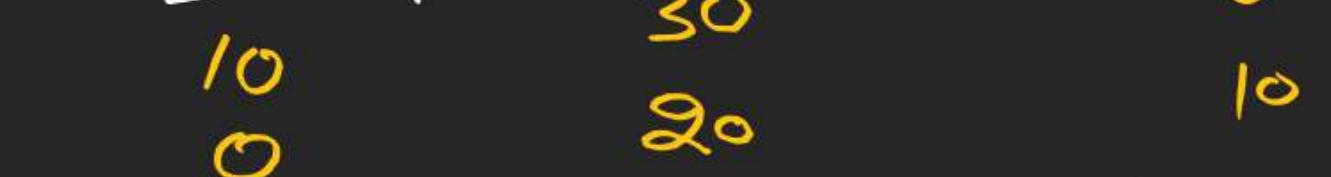
④



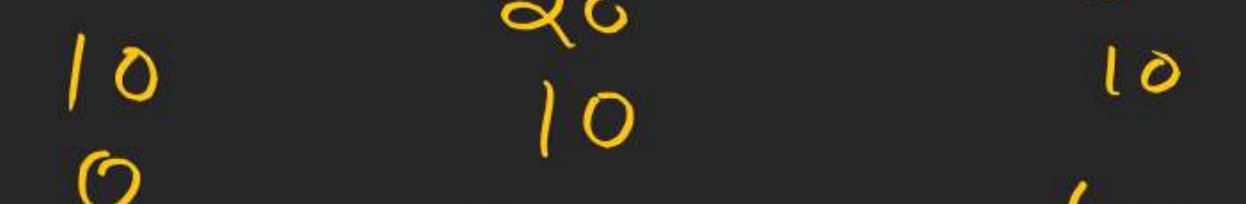
⑤



⑥



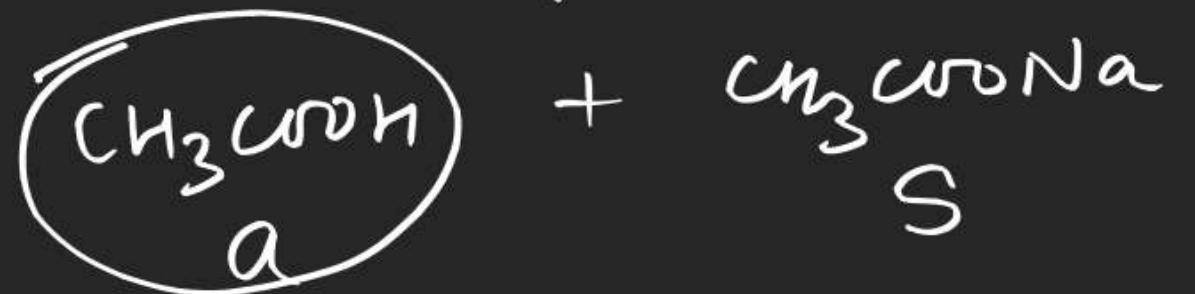
⑦



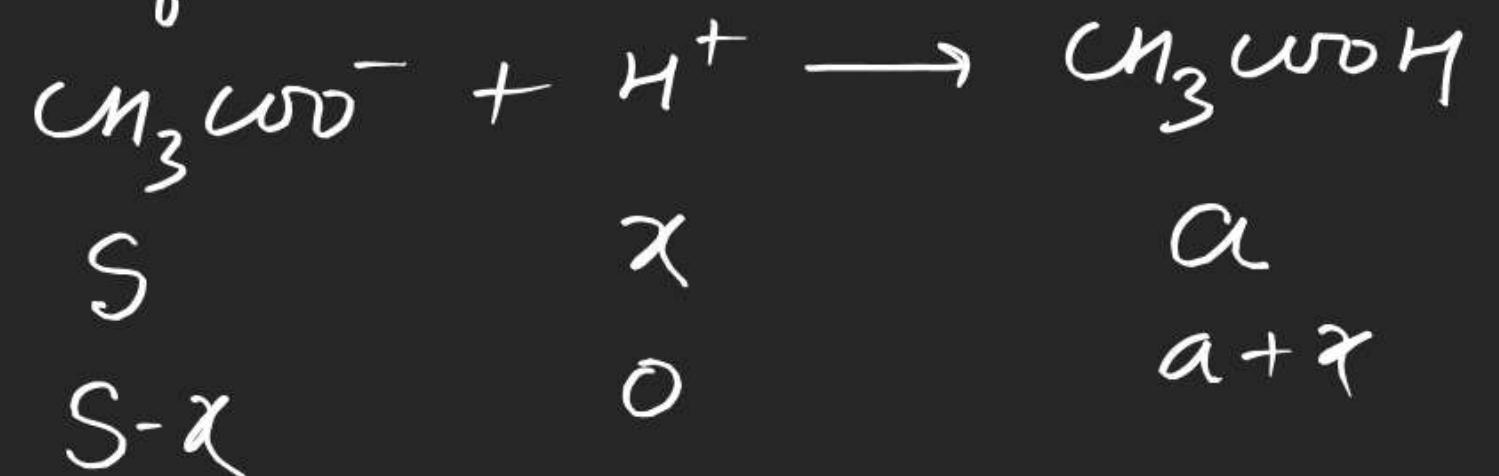
$$\left(\frac{10}{500} \right)$$

$$\left(\frac{10}{50} \right)$$

④ Change in pH of a Buffer solⁿ: →



addⁿ of H^+



Q. 1 mol each of HA &

$$\text{pH} = \text{pK}_a + \log \frac{S-x}{a+x}$$

Q. 1 mol each of HA & NaA are mixed to form a ^{lit} Buffer soln. find

① pH of soln — ④

② pH of soln if $\frac{1}{3}$ mol HCl is added

③ pH of soln if $\frac{1}{3}$ mol NaOH is added

$$\text{pH} = 4 + \log \frac{1 - \frac{1}{3}}{1 + \frac{1}{3}}$$

④ pH of soln if it is diluted 10 times

$$\text{pH} = 4 + \log \frac{\frac{1}{10}}{\frac{1}{10}} = 4$$

⑤ pH of soln if it is diluted 10^4 times.

$$K_a = \frac{(S+x)(x)}{(a-x)}$$

$$\frac{0.1}{0.01}$$

$$10^{-3}$$

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

$$x = (12-1) \times 10^{-4}$$

$$10^{-4} = \frac{(10^{-4}+x)(x)}{(10^{-4}-x)}$$

⑤ Buffer capacity: \rightarrow It is equal to the no of moles of H^+ or OH^- added to change the pH of 1 lit Buffer soln by 1 unit.

Nishant Jindal

O-I - 52-53, 65-68

S-I 51-52, 42

S-II 1-5
