

$$pH = pK_a + \log \frac{[S]}{[A]}$$

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

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

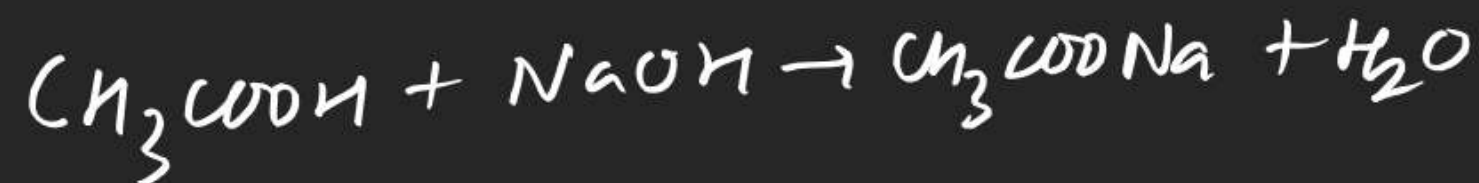
$$V = 2$$

$$pH = pK_a + \log \frac{a/4}{3a/4}$$

$$= pK_a + \log 1/3$$

$$pH = pK_a + \log \frac{a/2}{a/2}$$

(64)



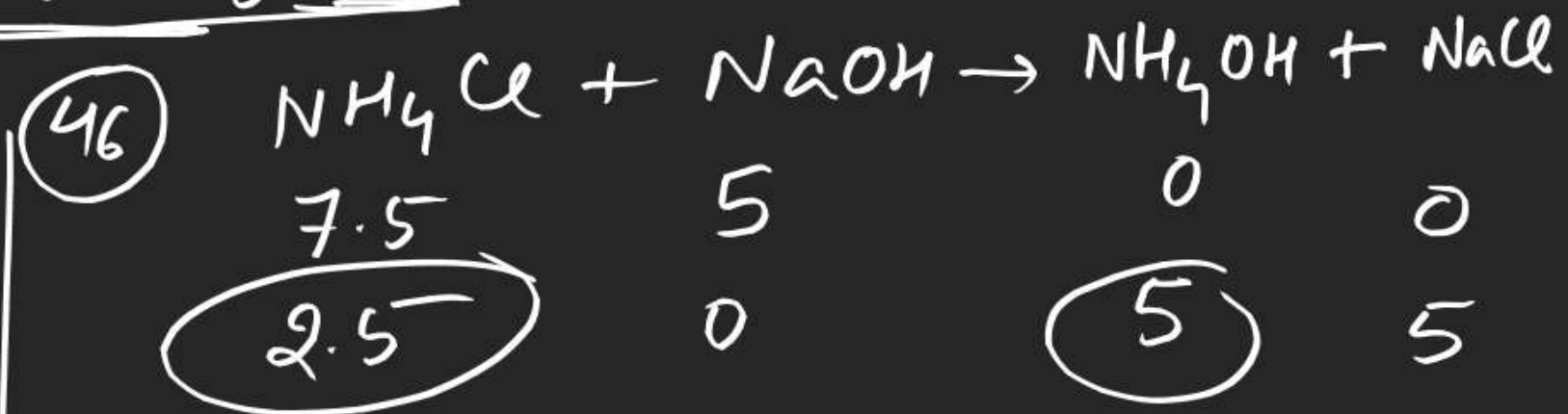
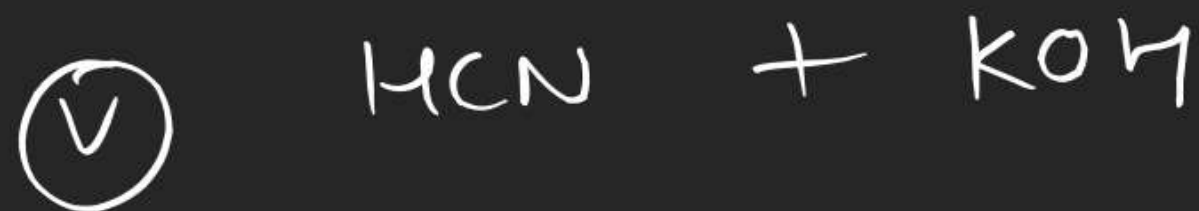
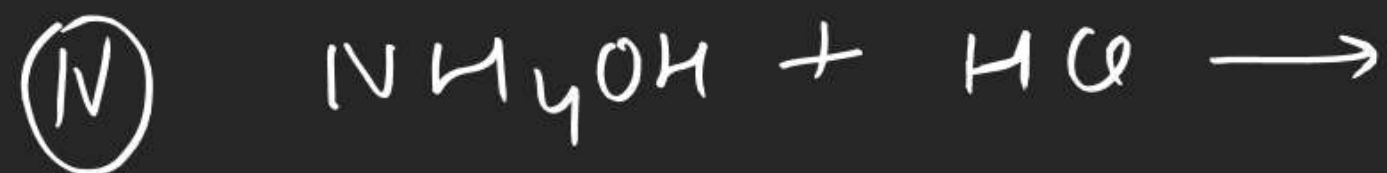
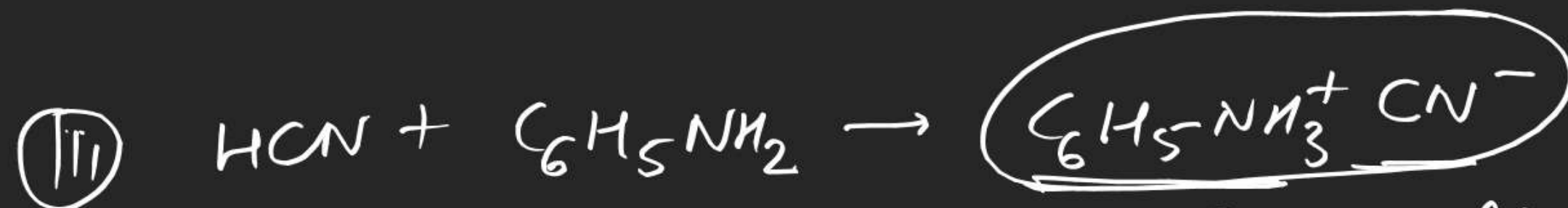
a

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

a/4

a/2

a/2



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

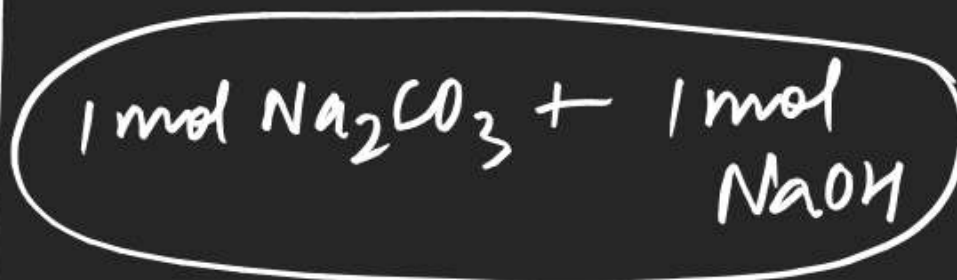
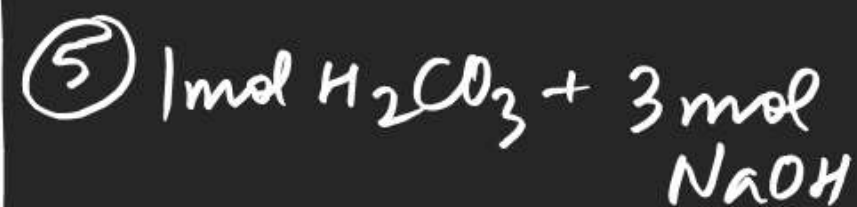
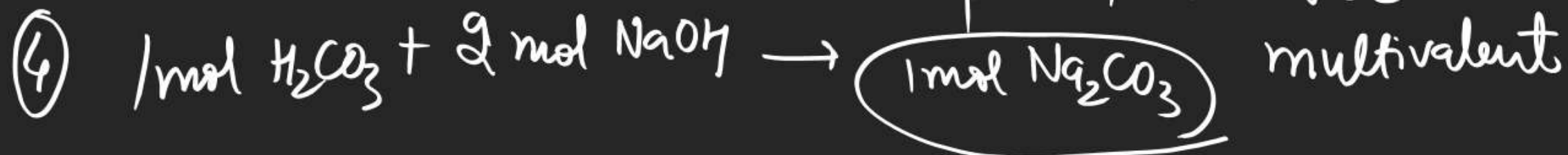
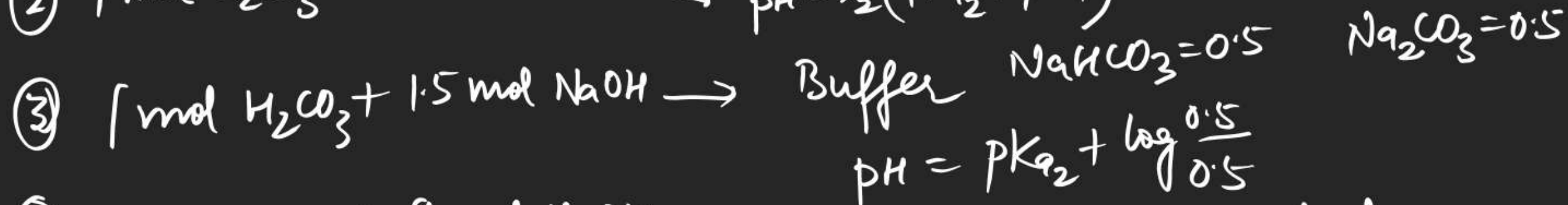
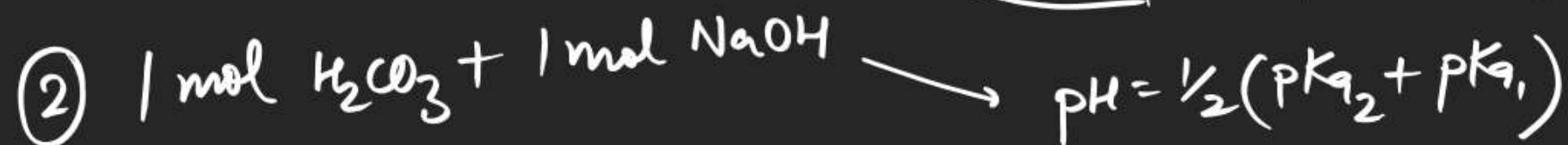
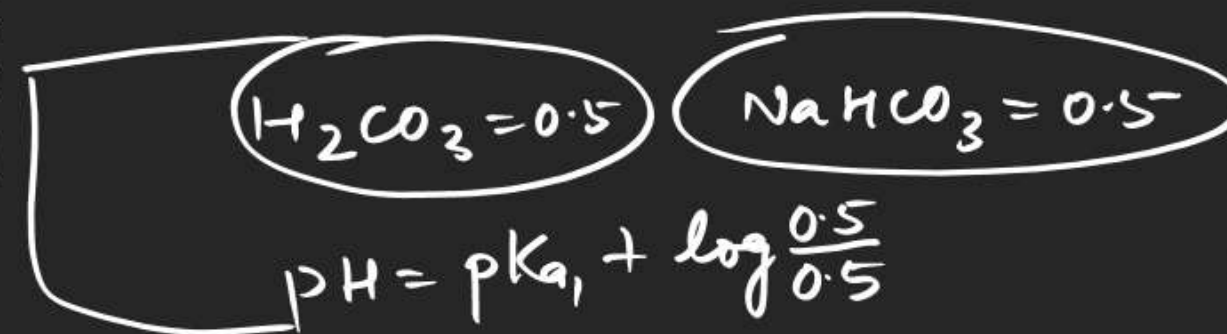
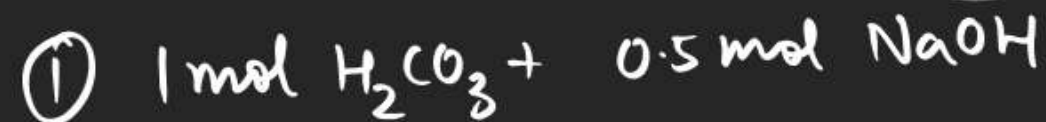
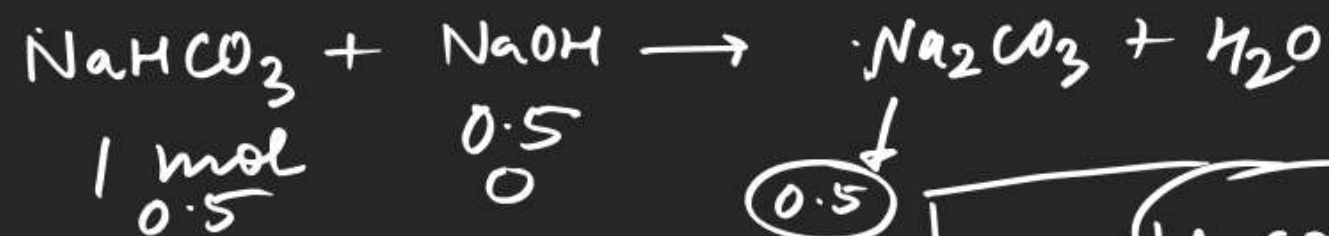
(49)

1 lit 0.2 M  $\text{CH}_3\text{COOH}$  + 1 lit 0.2 M  $\text{NaOH}$ 



2	1	1	Buffer
1	0	0	
1	1	1	Salt
0	0	0	
1	2	0	
0	1	1	CIE





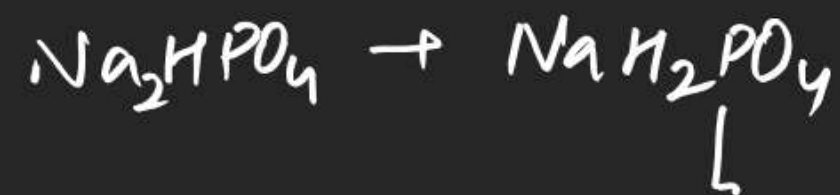
①	100 ml	0.1 M	$\text{H}_3\text{PO}_4$	+	50 ml	0.1 M	$\text{NaOH}$		$\text{H}_3\text{PO}_4 + \text{NaH}_2\text{PO}_4$ $\text{pH} = \text{pK}_{a1}$
②	"	"		+	100 ml	"	"	→	② $\text{NaH}_2\text{PO}_4$ $\frac{1}{2}(\text{pK}_{a2} + \text{pK}_{a1})$
③	"	"		+	150 ml	"	"	→	③ $\text{NaH}_2\text{PO}_4 + \text{Na}_2\text{HPO}_4$ $\text{pH} = \text{pK}_{a2}$
④	"	"		+	<u>200 ml</u>	"	"	→	④ $\text{Na}_2\text{HPO}_4$ $\frac{1}{2}(\text{pK}_{a3} + \text{pK}_{a2})$
⑤	"	"		+	250 ml	"	"	→	⑤ $\text{Na}_2\text{HPO}_4 + \text{Na}_3\text{PO}_4$ $\text{pH} = \text{pK}_{a3}$
⑥	"	"		+	<u>300 ml</u>	"	"	→	⑥ $\text{Na}_3\text{PO}_4$ $\frac{K_w}{K_{a3}} = \frac{x^2}{C-x}$
⑦	"	"		+	400 ml	"	"	→	

$$[\text{Na}_3\text{PO}_4] = 10/500$$

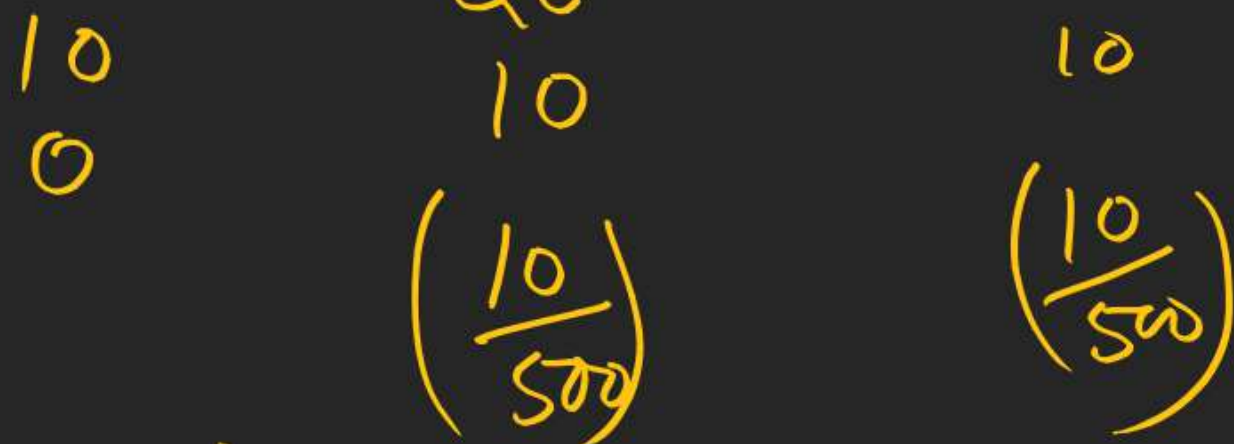
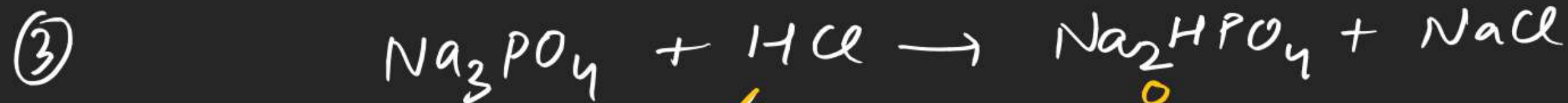
$$[\text{NaOH}] = 10/500$$

$$C = \frac{10}{400} = \frac{1}{40}$$

Q ① 100 ml 0.1M  $\text{Na}_3\text{PO}_4$  + 50 ml 0.1M  $\text{HCl}$

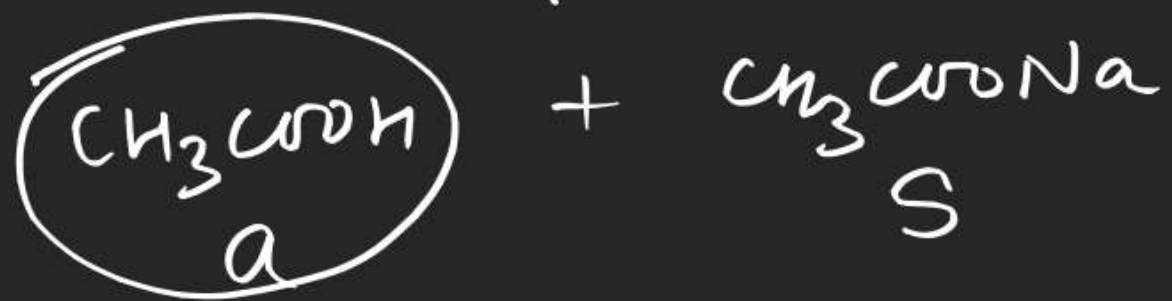


②

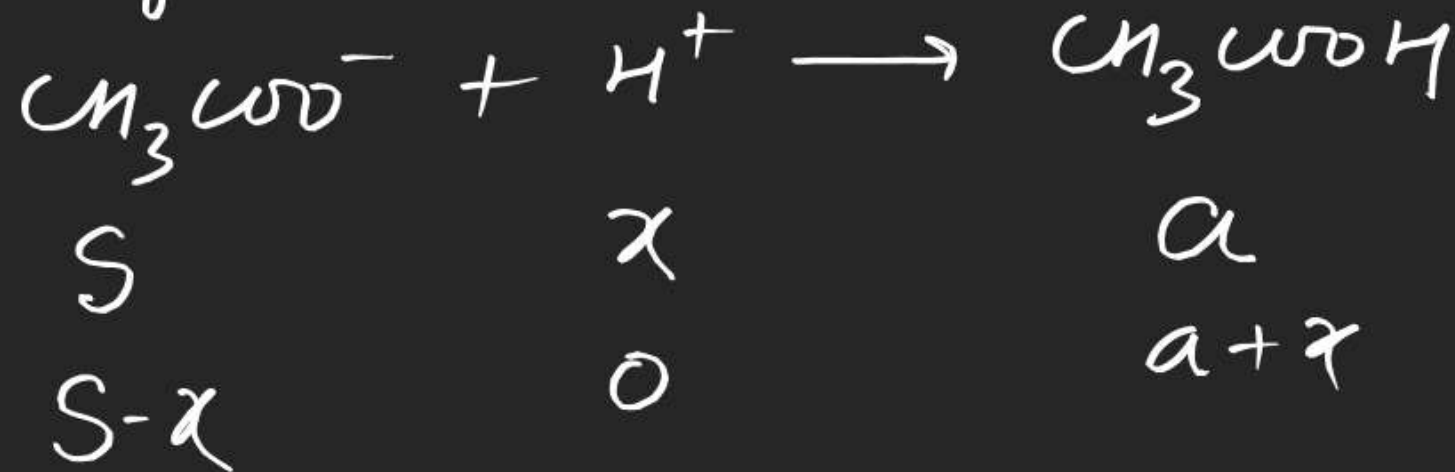




shant  
④



add<sup>n</sup> of  $H^+$



$$pH = pK_a + \log \frac{S_F x}{a_{\pm} x}$$

Q. 1 mol each of HA &



Q. 1 mol each of HA & NaA are mixed to form a <sup>1 lit</sup> Buffer sol<sup>n</sup>. find

(i) pH of sol<sup>n</sup> — (4)

(ii) pH of sol<sup>n</sup> if  $\frac{1}{3}$  mol HCl is added (3.7)

(iii) " " "  $\frac{1}{3}$  " NaOH is added (4.3)

$$pK_a(\text{HA}) = 4$$

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

(iv) pH of sol<sup>n</sup> if it is diluted 10 times

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

(v) pH of sol<sup>n</sup> if it is diluted  $10^4$  times.

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

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

$$10^{-3}$$

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

$$x = (\sqrt{2} - 1) \times 10^{-4}$$

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

⑤ Buffer capacity! → It is equal to the no of moles of  $H^+$  or  $OH^-$  added to change the pH of 1 lit Buffer sol<sup>n</sup> by 1 unit.

0-I - 52-53, 65-68

S-I

51-52, 42

S-II

1-5

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