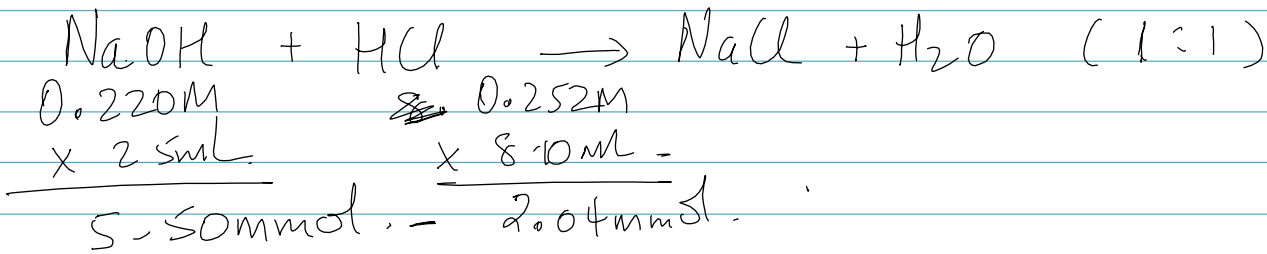


Acid-base Eq. (12) Titration (1) SA/SB and WA/SB.

* (1) What is the pH of a solution of 25.00 ml, 0.220 M NaOH, after 8.10 ml 0.252 M HCl has been added.



$$5.50 - 2.04 = 3.46 \text{ mmol of NaOH.}$$

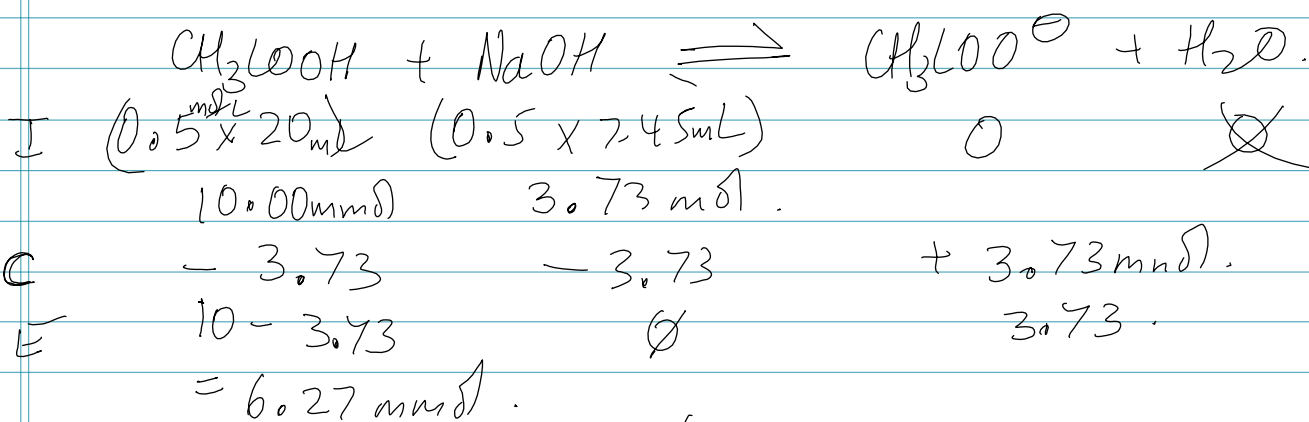
$$\text{total vol} = 25 + 8.10 = 33.10 \text{ ml} \leftarrow$$

$$[\text{OH}^\ominus] = \frac{3.46 \text{ mmol}}{33.10 \text{ ml}} = 0.105 \text{ M}$$

$$\text{pOH} = -\log 0.105 = 0.981$$

$$\text{pH} = 14 - 0.981 = \boxed{13.02} \quad *$$

* (2) Calculate the pH when 20.00 ml of 0.500 M CH₃COOH is titrated with 7.45 ml of 0.500 M NaOH.
 $K_a \text{ CH}_3\text{COOH} = 1.8 \times 10^{-5}$



$$\begin{aligned}
 \{ \text{H}_3\text{O}^\oplus \} &= K_a \times \frac{\text{acid}}{\text{base}} = 1.8 \times 10^{-5} \times \frac{6.27}{3.73} \\
 &= 3.03 \times 10^{-5} \text{ M}
 \end{aligned}$$

$$\boxed{\text{pH} = 4.52}$$