

Answer on Question #52020, Chemistry, Physical Chemistry

Question: If 150 mL 0.1 M NaOH and 100 mL 0.1 M CH₃COOH is mixed to make a buffer, what is the pH of this buffer? $k_a=1.8 \times 10^{-5}$

Answer:

The pH can be founded by using of Henderson-Hasselbalch equation:

$$pH = pKa + \log \frac{[NaOH]}{[CH_3COOH]}$$

The number of moles of NaOH = $0.1M \times 0.150L = 0.015$ moles.

The number of moles of CH₃COOH = $0.1M \times 0.1L = 0.01$ moles

$pKa = -\log Ka = 4.75$

So,

$$pH = 4.75 + \log \frac{0.015}{0.01} = 4.93$$