Answer on Question #62886 - Chemistry | General Chemistry

10 ml 0.2M__ is added to 1L 0.2 M acetate buffer with pH 4.75. What will the new pH be?

Solution

1) If 10 ml 0.2M is Base (for example NaOH), than

$$\mathrm{pH} = \mathrm{pK_a} + \log\left(\frac{\mathrm{Base}}{\mathrm{Acid}}\right)$$

n=C·V

n(NaOH)=$0.2M \cdot 0.01L = 0.002$ mol of $\mathrm{OH^-}$ ions into the solution.

An acetate buffer is acetic acid and sodium acetate. If [acetic acid] = [sodium acetate] in buffer solution, than pH= $\mathrm{pK_a}$.

The concentration of CH_3COOH would change from 0.2 M to 0.198 M and the concentration of CH_3COO^- would change from 0.2 M to 0.202 M.

$$\mathrm{pH} = 4.75 + \log\left(\frac{0.202}{0.198}\right) = 4.759 \approx 4.76$$

2) If 10 ml 0.2M is Acid, than the concentration of CH_3COOH would change from 0.2 M to 0.202 M and the concentration of CH_3COO^- would change from 0.2 M to 0.198 M.

And pH=$4.75 + log\left(\frac{0.198}{0.202}\right) = 4.741$

Answer

New pH=4.76 or 4.741.