

Problem and Answer by Mark Hayden

How many moles NaOH are required to change the pH of 100ml of buffer made from 0.1M NaNO_2 + 0.22M HNO_2 to pH = 4
 K_a of $\text{HNO}_2 = 4.5 \times 10^{-4}$ M

$$\begin{array}{l} 0.22\text{M acid} \times .1\text{L} = 0.022\text{ mol/acid} \\ 0.1\text{M base} \times .1\text{L} = 0.01\text{ mol/base} \end{array} \left. \vphantom{\begin{array}{l} 0.22\text{M acid} \\ 0.1\text{M base} \end{array}} \right\} 0.012\text{ mol acid remaining}$$

$$1 \times 10^{-4}\text{M} \cdot .1\text{L} = 1 \times 10^{-5}\text{ mol acid}$$