Calculate the pH of a buffer prepared by mixing:

40.0 mL of 1.0 M C_2H_5OOH $\quad K_a = 1.3 \times 10^{-5}$

60.0 mL of 0.1 M NaOH

$$\text{mol } C_2H_5OOH = 0.04 \text{ L} \times 1.0 \frac{\text{mol}}{\text{L}} = 0.04 \text{ mol}$$

$$\text{mol } OH^- = 0.06 \text{ L} \times 0.1 \frac{\text{mol}}{\text{L}} = 0.006 \text{ mol}$$

$$C_2H_5OOH + OH^- \rightarrow C_2H_5OO^- + H_2O$$

$$\text{mol } C_2H_5OOH = 0.040 - 0.006 = 0.034$$

$$\text{mol } C_2H_5OO^- = 0.006 \quad \text{volume} = 0.100 \text{ L}$$

$$[C_2H_5OOH] = 0.34 \text{ M} \quad [C_2H_5OO^-] = 0.06 \text{ M}$$