benzoic acid + KOH →

$A^- + H_2O \rightleftharpoons HA + OH^-$ $\quad K_b = \frac{[HA][OH^-]}{[A^-]} = \frac{x^2}{F'-x}$

$K_b = 1.58 \times 10^{-10}$

$F' = [A^-] + [HA] = 0.057 \frac{mol}{L} \cdot \frac{50\,mL}{89.42\,mL} = 0.032\,M$

assume $F' \gg x$

$[OH] = \sqrt{K_b \cdot F'} = 2.248 \times 10^{-6}\,M$ assumption good!

$pOH = 5.6$

$pH = 8.35$

$M_1V_1 = M_2V_2$

$[OH^-] = 0.0733\,M \cdot \frac{(45ml - 39.42mL)}{(45mL + 50mL)}$ $\quad \frac{4.58\,mL}{95\,mL}$

$[OH^-] = 0.00348$

$pOH = 2.46$

$pH = 11.54$