Answer on Question #71722 - Chemistry - General Chemistry

Question:

Calculate the pH for each of the following cases in the titration of 50.0 mL of 0.130 M HClO(aq) with 0.130 M KOH(aq).

Solution:

To solve this problem, we use the equations:

$C_1 \cdot V_1 = C_2 \cdot V_2$;

$pH = -\log[H^+]$;

Let us find the volume of KOH that was used:

$V_{KOH} = \frac{C_{HClO} \cdot V_{HClO}}{C_{KOH}} = \frac{0.130 \cdot 50}{0.130} = 50\ mL$;

Let us find the pH of the acid HClO(aq):

$pH = -\log[H^+] = -\log(C_{HClO} \cdot V_{HClO}) = -\log(0.130 \cdot 0.05) = -\log(0.0065) = 2.19$;

Let us find the pH of the base KOH:

$pOH = -\log[OH^-] = -\log(C_{KOH} \cdot V_{KOH}) = -\log(0.130 \cdot 0.05) = -\log(0.0065) = 2.19$;

$pH = K_w - pOH = 14 - 2.19 = 11.81$.

Answer:

pH (HClO) = 2.19;
pH (KOH) = 11.81.