Quiz 17.2 – Strong Acid/Base Titrations

Name: Key

These questions concern titrating a solution of HCl with NaOH. 25.00 ml of the HCl solution with unknown concentration are placed in an Erlenmeyer flask, and a burette is filled with a 0.125 M solution of NaOH

Question 1

NaOH is added slowly while the pH is monitored. How will you know when the equivalence point of the titration has been reached?

Graph pH vs titrant added. Equivalence is the point with steepest slope ← Here!

Question 2

The equivalence point is reached after 34.65 ml of the base have been added.
What was the initial acid concentration?

$C_A V_A = C_B V_B$ $\quad C_A \cdot 25.00\,ml = 0.125M \cdot 34.65\,ml$

$C_A = 0.17325M = 0.173M$

Question 3

Now that you know the initial concentration, calculate what the pH should have been before any base was added

$pH = -\log[H^+] = 0.761$

Question 4

What will the pH be after you have added 34.40 and 34.90 ml of the NaOH solution ~~0.125M · 34.65 ml = 4.33 mmol~~

↳ 4.30 mmol ↳ 4.36 mmol

	H^+	OH^-
B	4.33	4.30
C	-4.30	-4.30
A	0.03	0

$[H^+] = \frac{0.03\,mmol}{59.4\,ml}$

	H^+	OH^-
B	4.33	4.36
C	-4.33	-4.33
A	0	0.03

$[OH^-] = \frac{0.03\,mmol}{59.40\,ml}$

Question 5

$[H^+] = 5.05 \cdot 10^{-4} M \rightarrow pH = 3.30$ $\quad [OH^-] = 5.01 \cdot 10^{-4} M \rightarrow pH = 10.70$

Sketch the titration curve, noting the pH at the most important points