Key.

Acid Base III Worksheet No. 1

60.0 mL of 0.10 M HCl are titrated with 0.20 M NaOH solution. Calculate the pH and plot the titration curve for the process when the following volumes of NaOH are added.

Mol H^+	vol. NaOH added	Moles OH^-	mol excess	[conc]	pH
6.00 mmol	0.0 mL	0.00	6.00 mmol	0.10	1.00
	5.0 mL	1.00 mmol	5.00 mmol	0.077	1.11
	10.0 mL	2.00 mmol	4.00 mmol	0.057	1.24
	15.0 mL	3.00 mmol	3.00 mmol	0.040	1.40
	20.0 mL	4.00 mmol	2.00 mmol	0.025	1.60
	25.0 mL	5.00 mmol	1.00 mmol	0.012	1.93
	28.0 mL	5.60 mmol	0.40 mmol	4.5×10^{-3}	2.34
	29.0 mL	5.80 mmol	0.20 mmol	2.2×10^{-3}	2.65
	29.5 mL	5.90 mmol	0.10 mmol	1.1×10^{-3}	2.95
	30.0 mL	6.00 mmol	0.00 mmol	1.0×10^{-7} M	7.00
	30.5 mL	6.10 mmol	0.10 mmol	1.1×10^{-3}	11.04
	31.0 mL	6.20 mmol	0.20 mmol	2.2×10^{-3}	11.34
	35.0 mL	7.00 mmol	1.00 mmol	0.011	12.02
↓	60.0 mL	12.0 mmol	6.00 mmol	0.050	12.70

What is the pH at the equivalence point?

7.00

What is the volume of NaOH added at the midpoint

15.0 mL

What is the pH at the midpoint?

1.40

What is the K_a of the indicator you should use for this titration?

1.0×10^{-7}

Which indicator should you choose?

bromthymol blue

or phenol red

or neutral red.