Answer on Question #71672, Chemistry / General Chemistry :

50.0 ml of 5.00 M NaOH solution so that 25.0 ml of this diluted solution requires 28.5 ml of 1.50 m HCL solution to titrate

Solution.

$V(NaOH) = 50ml = 0.05l$

$C(NaOH) = 5.0M$

$V(NaOH) = 25ml = 0.025l$

$C(HCl) = 1.5M$

$V(HCl) = 28.5ml$

$C(NaOH) - ?$

Molar concentration:

$$C(NaOH) = \frac{v(NaOH)}{V(NaOH)}$$

Titration rule:

$$C(NaOH) \cdot V(NaOH) = C(HCl) \cdot V(HCl)$$

$$C(NaOH) = \frac{C(HCl) \cdot V(HCl)}{V(NaOH)}$$

And:

$$C(NaOH) = \frac{C(HCl) \cdot V(HCl)}{V(NaOH)} = \frac{1.5M \cdot 28.5ml}{25ml}$$

$$C(NaOH) = 1.71M$$

And volume of solution after dilution:

$$V_1(NaOH) = \frac{C(NaOH) \cdot V(NaOH)}{C_1(NaOH)} = \frac{5M \cdot 50ml}{1.71M}$$

$$V_1(NaOH) = 146.2ml$$

Volume H₂O:

$$V(H_2O) = V_1(NaOH) - V(NaOH)$$

$$V(H_2O) = 146.2ml - 50ml$$

$$V(H_2O) = 96.2ml$$

Answer: $C(NaOH) = 1.71M$, $V_1(NaOH) = 146.2ml$, $V(H_2O) = 96.2ml$