General Chemistry
Mr. MacGillivray
Quiz #39:
pH Calculations II

$pH = -\log[H_3O^+]$

$pOH = -\log[OH^-]$

$pOH + pH = 14$

$[H_3O^+] \times [OH^-] = 1.00 \times 10^{-14} = K_w$

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1. Write the chemical equation for the dissociation of $Al(OH)_3$ when it dissolves in water.

$Al(OH)_3 \rightarrow Al^{3+} + 3OH^-$

2. What is the $[OH^-]$ of 0.00567 M $Al(OH)_3$ (aq)?

$0.00567 \frac{mol\ Al(OH)_3}{L} \times \frac{3\ mol\ OH^-}{1\ mol\ Al(OH)_3} = 0.0170 \frac{mol\ OH^-}{L}$

A 16.5 mL sample of 0.215 M NaOH required 30.3 mL of HCl solution to reach the endpoint of an acid-base titration.

$NaOH_{(aq)} + HCl_{(aq)} \rightarrow NaCl_{(aq)} + H_2O_{(l)}$

3. Write the equation for the chemical reaction.

0.215	M	?
0.0165 L	V	0.0303 L
0.00355 mol	n	0.00355 mol

4. Calculate the molarity of the of the original HCl solution.

(a) $M = \frac{n}{V}$

$n = MV = (0.215 \frac{mol}{L})(0.0165 L)$

$= 0.00355$ mol NaOH

(b) $0.00355 mol\ NaOH \times \frac{1\ mol\ HCl}{1\ mol\ NaOH} = 0.00355 mol\ HCl$

(c) $M = \frac{n}{V} = \frac{0.00355 mol}{0.0303 L}$

$= 0.117 M$