pH and pOH Calculations

1. What is the pH of a 0.0235 M HCl solution?

2. What is the pOH of a 0.0235 M HCl solution?

3. What is the pH of a 6.50×10^{-3} M KOH solution?

4. What is the pH of a 6.2×10^{-5} M NaOH solution?

5. Write the equation for the dissociation of aluminum hydroxide.

6. If the pH is 9.85, what is the concentration of the aluminum hydroxide solution?

7. Write the equation for the dissociation of calcium hydroxide.

8. If the pH is 11.64 and you have 2.55 L of solution, how many grams of calcium hydroxide are in the solution?

pH and pOH Calculations

1. What is the pH of a 0.0235 M HCl solution?

$pH = -\log [H^+] = -\log (0.0235) = 1.629$

2. What is the pOH of a 0.0235 M HCl solution?

$pH = -\log [H^+] = -\log (0.0235) = 1.629$
$pOH = 14 - pH = 14 - 1.629 = 12.371$

3. What is the pH of a 6.50×10^{-3} M KOH solution?

$pOH = -\log [OH^-] = -\log (6.50 \times 10^{-3}) = 2.187$
$pH = 14 - pOH = 14 - 2.187 = 11.813$

4. What is the pH of a 6.2×10^{-5} M NaOH solution?

$pOH = -\log [OH^-] = -\log (6.2 \times 10^{-5}) = 4.21$
$pH = 14 - pOH = 14 - 4.21 = 9.79$

5. Write the equation for the dissociation of aluminum hydroxide.

$Al(OH)_3\ (aq.) \rightleftharpoons Al^{3+}\ (aq.) + 3\ OH^-\ (aq.)$

6. If the pH is 9.85, what is the concentration of the aluminum hydroxide solution?

$pOH = (14 - pH) = (14 - 9.85) = 4.15$
$[OH^-] = 10^{-pOH} = 10^{-4.15} = 7.08 \times 10^{-5}$ M
$[Al(OH)_3] = [OH^-]/3 = 7.08 \times 10^{-5}$ M$/3 = 2.36 \times 10^{-5}$ M

7. Write the equation for the dissociation of calcium hydroxide.

$Ca(OH)_2\ (aq.) \rightleftharpoons Ca^{2+}\ (aq.) + 2\ OH^-\ (aq.)$

8. If the pH is 11.64 and you have 2.55 L of solution, how many grams of calcium hydroxide are in the solution?

$pOH = (14 - pH) = (14 - 11.64) = 2.36$
$[OH^-] = 10^{-pOH} = 10^{-2.36} = 4.4 \times 10^{-3}$ M
Number of moles of $Ca(OH)_2 = (4.4 \times 10^{-3}$ mol/L$/2) \times 2.55$ L $= 0.00561$ mol
Mass of NaOH $= (0.00561$ mol $\times 74.093$ g/mol$) = 0.416$ g