Chemistry 12 Acid Base Worksheet 2 Name Key

1. Fill in the missing values:

Solution	$[H_3O^+]$	$[OH^-]$	pH	pOH
Water	1.0×10^{-7}	1.0×10^{-7}	7.00	7.00
0.10 M HCl	1.0×10^{-1}	1.0×10^{-13}	1.00	13.00
0.010 M NaOH	1.0×10^{-12}	1.0×10^{-2}	12.00	2.00
1.0 M HNO_3	1.0	1.0×10^{-14}	0.00	14.00
1.0 M H_2SO_4	2.0	5.0×10^{-15}	−0.30	14.30
blood	3.98×10^{-8}	2.51×10^{-7}	7.400	6.600
16 M HNO_3	16.0	6.25×10^{-16}	−1.204	15.204
6.0 M NaOH	1.67×10^{-15}	5.99	14.777	−0.777
0.10 M Na_2O	5.0×10^{-14}	0.20	13.30	0.70
0.010 M $Ca(OH)_2$	5.0×10^{-13}	0.020	12.30	1.70
2.0 M NaOH	5.0×10^{-15}	2.0	14.30	−0.30

2. Calculate the concentration of OH^- in a water solution in which the H_3O^+ concentration is 1.0×10^{-11} M. Then calculate the pH, and tell whether the solution is acidic, basic, or neutral. $[OH^-] = \frac{K_w}{[H_3O^+]} = \frac{1.00 \times 10^{-14}}{1.0 \times 10^{-11}} = 1.0 \times 10^{-3}$ M $pH = -\log(1.0 \times 10^{-11}) =$ 11.00 basic

3. Calculate the concentration of H_3O^+ in a water solution in which the OH^- concentration is 1.0×10^{-8} M. Then calculate the pH, and tell whether the solution is acidic, basic, or neutral. $[H_3O^+] = \frac{K_w}{[OH^-]} = \frac{1.00 \times 10^{-14}}{1.0 \times 10^{-8}} = 1.0 \times 10^{-6}$ M $pH = -\log(1.0 \times 10^{-6}) =$ 6.00 acidic

4. Calculate the concentration of H_3O^+ and OH^- in a water solution in which the pH= 5.00. Tell whether the solution is acidic, basic, or neutral. $[H_3O^+] = \text{antilog}(-5) = 1.0 \times 10^{-5}$ M $[OH^-] = \frac{K_w}{[H_3O^+]} = \frac{1.00 \times 10^{-14}}{1.0 \times 10^{-5}} = 1.0 \times 10^{-9}$ M acidic

5. Calculate the pH of a solution in which pOH = 13.00. Then calculate the concentration of OH^- and of H_3O^+ in the solution. Tell whether the solution is acidic, basic, or neutral. $[OH^-] = \text{antilog}(-13.00) = 1.0 \times 10^{-13}$ M $pH = pK_w - pOH = 14.00 - 13.00 =$ 1.00 $[H_3O^+] = \text{antilog}(-1.00) = 1.0 \times 10^{-1}$ M acidic

6. Calculate the concentration of OH^- in a water solution in which the H_3O^+ is 1.0×10^{-12} M. Then calculate the pH and tell whether the solution is acidic, basic, or neutral, and support your answer. $[OH^-] = K_w / [H_3O^+] = \frac{1.00 \times 10^{-14}}{1.0 \times 10^{-12}} = 1.0 \times 10^{-2}$ M $pH = -\log(1.0 \times 10^{-12}) =$ 12.00 basic because $[OH^-] > [H_3O^+]$

7. Calculate the concentration of H_3O^+ in a water solution in which the OH^- concentration is 1.0×10^{-6} M. Then calculate the pH, and tell whether the solution is acidic, basic, or neutral and support your answer. $[H_3O^+] = K_w / [OH^-] = 1.00 \times 10^{-14} / 1.0 \times 10^{-6} = 1.0 \times 10^{-8}$ M basic because $[OH^-] > [H_3O^+]$

$pH = -\log(1.0 \times 10^{-8}) =$ 8.00