KEY

Practice – pH and pOH

1.) Solve for the log of the following.

a.) 10 — 1

b.) 15 000 — 4.2

c.) 0.001 — -3

d.) 1.00 — 0

e.) 4.29×10^{-9} — -8.37

f.) 6.11×10^{-5} — -4.21

2.) Solve for the antilog of the following.

b.) 5 — 10 000

b.) -3 — 0.001

c.) -4.230 — 5.888×10^{-5}

d.) 1.00 — 10.0

e.) -5.35 — 4.47×10^{-6}

f.) 10 — 1×10^{10}

3.) Calculate pH and pOH.

a.) $[H_3O^+] = 11.8\ M$

Answer - $pH = -\log[H_3O^+]$ $pH = -1.071$

$pH + pOH = 14$ $pOH = 15.070$

b.) $[OH^-] = 5.25 \times 10^{-3}\ M$

Answer - $pOH = -\log[OH^-]$ $pOH = 2.280$

$pH + pOH = 14$ $pH = 11.720$

c.) $[OH^-] = 2.31 \times 10^{-5}\ M$

Answer - $pOH = -\log[OH^-]$ $pOH = 4.636$

$pH + pOH = 14$ $pH = 9.364$

d.) $[H_3O^+] = 8.51 \times 10^{-9}\ M$

Answer - $pH = -\log[H_3O^+]$ $pH = 8.070$

$pH + pOH = 14$ $pOH = 5.930$

e.) $[OH^-] = 0.054\ M$

$pOH = -\log[OH^-]$ $pOH = 1.27$

$pH + pOH = 14$ $pH = 12.73$

f.) $[H_3O^+] = 7.3 \times 10^{-12}\ M$

Answer - $pH = -\log[H_3O^+]$ $pH = 11.14$

$pH + pOH = 14$ $pOH = 2.86$

4.) At 60°C, the pK_w is 13.018. Calculate the $[H_3O^+]$, $[OH^-]$, pH, and pOH for the water.

Answer – Since the water is still neutral then $pH = pOH$.

$pK_w = pH + pOH$ $13.018 = pH + pOH$ $pH = 6.509$ and $pOH = 6.509$

$pH = -\log[H_3O^+]$ $[H_3O^+] = 3.10 \times 10^{-7}$

$pOH = -\log[OH^-]$ $[OH^-] = 3.10 \times 10^{-7}$

5.) You have equal amounts of two weak acids. If the pH of HA is 2.1 and the other is 4.5, which solution will conduct better?

Answer – HA will conduct better. A lower pH tells one that it is a stronger acid. Stronger acids dissociate or ionize more, resulting in more conducting ions in solution.