CONCEPT: pH AND pOH OF COMPOUNDS

To deal with incredibly small concentration values of $[H^+]$ and $[OH^-]$ we can use the pH scale.

- Under normal conditions, the pH scale operates within the range of _____ to _____ .

By taking the – log of $[H^+]$ and $[OH^-]$ we can find pH and pOH.

$$pH = -\log[H^+] \qquad pOH = -\log[OH^-] \qquad p = -\log$$

By recognizing the relationship between $[H^+]$ and $[OH^-]$ with pH and pOH we can create new formula relationships.

In general as the pH value increases there is a ____ $[H^+]$ & ____ $[OH^-]$.

- A species with a pH equal to 7 is classified as _____ : $[H^+]$ ____ 1.0×10^{-7} M ____ $[OH^-]$.
- A species with a pH greater than 7 is classified as _____ : $[H^+]$ ____ 1.0×10^{-7} M ____ $[OH^-]$.
- A species with a pH less than 7 is classified _____ : $[H^+]$ ____ 1.0×10^{-7} M ____ $[OH^-]$.

By using – log with the equilibrium expression for water a relationship between pH and pOH can be created.

$$pH + pOH = 14$$

EXAMPLE: What is the hydroxide ion and hydronium ion concentration of a solution with a pH equal to 5.88?

PRACTICE: pH AND pOH OF COMPOUNDS

EXAMPLE 1: Of the following options, a solution with which pH would have the greatest concentration of hydronium ions?

a) 4

b) 8

c) 11

d) 13

EXAMPLE 2: What mass of HBr should a student mix into 250.00 mL of water to make a solution with a pH = 3.850?

a) 0.00286 g

b) 0.0547 g

c) 1.41×10^{-4} g

d) 0.0114 g

e) 2.87g

PRACTICE: What is the hydronium ion concentration in a solution having a pOH of 3.62?

a) 3.8×10^{-5} M

b) 4.2×10^{-11} M

c) 3.8×10^{-4} M

d) 2.6×10^{-11} M

e) 5.1×10^{-10} M