Name: Date: Period:

**Practice: Advanced pH Calculations**

**Part I: Calculate the [H+] and [OH-] for each of the following solutions:**

|  |  |  |
| --- | --- | --- |
| **pH** | **[H+]** | **[OH-]** |
| 12.54 |  |  |
| 1.76 |  |  |
| 2.89 |  |  |
| 9.81 |  |  |
| 7.54 |  |  |
| 6.96 |  |  |
| 5.51 |  |  |
| 13.97 |  |  |

**Part II: Calculate the [H+] and [OH-] for each of the following solutions:**

|  |  |  |
| --- | --- | --- |
| **pOH** | **[H+]** | **[OH-]** |
| 0.25 |  |  |
| 14.00 |  |  |
| 10.66 |  |  |
| 9.75 |  |  |
| 8.33 |  |  |
| 11.02 |  |  |
| 4.69 |  |  |
| 3.88 |  |  |

**Applying Concepts**:

Multiply the [H+] and [OH-] for each solution. What value do you get (this is something known as Kw)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part III: Word Problems**

1. A certain brand of soda has a pH of 4.03. However, a specific manufacturing defect caused the pH to be more acidic and changed the pH to 3.87. For the new pH, calculate both the [H+] and [OH-] concentrations.
2. Ammonia is a weak base with a pOH of 5.06. Calculate the hydrogen and hydroxide ion concentrations for ammonia.
3. Deciding between different brands of orange juice at the grocery store is one of the hardest things Mr. Ghosh has to do. He usually chooses between Tropicana, Florida’s Natural, and Minute Maid. The pH (or pOH) values for each are shown below:

Tropicana: pH = 3.46

Florida’s Natural: pOH = 9.98

Minute Maid: pH = 3.27

Calculate the [H+] and [OH-] concentrations for each brand.

**CHALLENGE (Extra Credit):**

1. Acids and Bases are divided into classes of strong and weak (something we’ll discuss tomorrow). It turns out that strong acids and bases dissociate completely in aqueous solution and their pH values can be solved for easily. For example, HCl is a strong acid. The dissociation and the pH calculation are shown below:

HCl 🡪 H+ + Cl-

pH of 0.072M HCl = 1.14

1. Based on the information above, calculate the pH of 0.056M NaOH, a strong base.
2. HF is a weak acid. This means that it does not dissociate completely into H+ and F-. Based on this information, would you expect 0.072M HF to have a higher or lower [H+] concentration than 0.072M HCl? Would it have a higher or lower pH than 0.072M HCl? Explain your answers.