

pHoey Homework – Investigation IV – Lesson 3

1. What pH would you expect from solutions with the following concentrations?
 $[H^+] = 1.0 \times 10^{-4} \text{ M}$
 $[H^+] = 1.0 \times 10^{-12} \text{ M}$
 $[OH^-] = 1.0 \times 10^{-8} \text{ M}$
 $[OH^-] = 1.0 \times 10^{-2} \text{ M}$
2. What is the pOH of each of the above solutions?
3. Using the results from Part II of the activity and a piece of graph paper, sketch a plot of pH vs. $[H^+]$. What do you observe?
4. Use your calculator to figure out the pH of each of the following solutions.
 - a.) $[H^+] = 0.0014$
 - b.) $[H^+] = 6.0 \times 10^{-8} \text{ M}$
 - c.) $[H^+] = 4.2 \times 10^{-11} \text{ M}$
 - d.) $[H^+] = 1.5 \times 10^{-1} \text{ M}$
 - e.) $[H^+] = 5.0 \times 10^{-4} \text{ M}$
 - f.) $[H^+] = 2.4 \times 10^{-13} \text{ M}$
5. Which of the solutions in question 4 are acids? Which are bases?
6. **Extra credit (you can earn bonus points on a HW Quiz if you figure this out):** Suppose you have 1 mL of 1.0 M HCl. How much water do you need to dilute it with to neutralize it (to a pH of 7)?

Selected Answers:

1. For $[H^+] = 1.0 \times 10^{-4} \text{ M}$, the pH would be 4; For $[OH^-] = 1.0 \times 10^{-2} \text{ M}$, the pH = 12
2. The pOH for $[H^+] = 1.0 \times 10^{-4}$ is 10; For $[OH^-] = 1.0 \times 10^{-2} \text{ M}$, the pOH is 2
- 4(a) $\text{pH} = -\log(.0014) = 2.85$