Accompanying Questions
Topic 12: Acids, Bases, and pH

Objective:

This is to provide guiding questions to help you comprehend the material we have covered in this section of the class. These questions or very similar questions have been answered within the video lecture and/or live class.

Instructions and Notes:

- Most of these questions/concepts are taken or derived from the chapters in the Chemistry: Atoms First 2e Online Textbook (OpenStax)
- Book sections covered: 14.1, 14.2

Submission:

Students do not submit this and it is not graded.

Helpful Tips:

- These questions or very similar questions may appear on the exams so I strongly recommend that you complete them.
- Download the lectures and rewatch the lectures.
- Pause the lectures and rewind them through concepts you don't fully understand.
- Go to tutoring in the ASTC or MESA, ask your classmates in our Discord room, watch YouTube Videos, come to office hours, etc.

In-Lecture Questions

Lecture 1 of 2

1. What is an acid?
2. What is a base?
3. What is another name for a hydrogen cation (H^{1+})?
4. H^{1+} is a shortcut for what?
5. Acid-base reactions usually occur in what?
6. Describe what a conjugate acid is. Give an example of an acid-conjugate base pair.
7. Describe what a conjugate base is. Give an example of a base-conjugate acid pair.
8. Write down two (2) acids, two (2) bases, and a base that's not OH^-. What part of those molecules are the "active" acid and base parts?
9. What does amphoteric mean? Give an example of an amphoteric molecule.
10. What is the formula for hydronium? What is a shortcut way of writing this?
11. What do brackets mean in $[H^+]$ and $[OH^-]$?
12. What is the concentration of hydronium and hydroxide in pure water at 25 °C?
13. What is the formula for K_W? What is the value of K_W? How many sigfigs does it have?
14. Write the equation if you're trying to calculate $[H^+]$ and you know $[OH^-]$.

15. Write the equation if you're trying to calculate $[OH^-]$ and you know $[H^+]$.
16. A solution of an acid in water has a hydronium ion concentration of 2.0×10^{-6} *M*. What is the concentration of hydroxide ion at 25 °C?
17. What is the hydronium ion concentration in an aqueous solution with a hydroxide ion concentration of 0.001 *M* at 25 °C?

Lecture 2 of 2

18. If something is acidic, does it have a high or low pH? Does it have a relatively high or low concentration of $[H^{1+}]$? Give two examples of something acidic.
19. If something is basic, does it have a high or low pH? Does it have a relatively high or low concentration of $[H^{1+}]$? Give two examples of something basic.
20. Describe the relationship between pH and pOH.
21. What does "p" mean in pH and pOH?
22. Write the 2 equations that lets you calculate pH from $[H^+]$ and pOH from $[OH^-]$.
23. What is pH? What is the pH of a solution containing 1×10^{-2} $[H^+]$?
24. What is pOH? What is the pOH of a solution containing 1×10^{-14} $[OH^-]$?
25. If you have a number with an exponent and you aren't sure how to input it correctly in your calculator, what should you use?
26. Write the 2 equations that lets you calculate $[H^+]$ from pH and $[OH^-]$ from pOH.
27. What is the $[H^+]$ of a solution with a pH of 3.0?
28. What is the $[OH^-]$ of a solution pOH of 13.00?
29. Explain significant figures if you're trying to calculate pH or pOH from $[H^+]$ or $[OH^-]$.
30. Explain significant figures if you're trying to calculate $[H^+]$ or $[OH^-]$ from pH or pOH.
31. Write the equation that relates pH and pOH.
32. Air-saturated water has a hydronium ion concentration caused by the dissolved CO_2 of 2.0×10^{-6} *M*, about 20-times larger than that of pure water. Calculate the pH of the solution at 25 °C. (remember sig figs)
33. Calculate the hydronium ion concentration of a solution with a pH of −1.07. (remember sig figs)
34. The hydronium ion concentration of vinegar is approximately 4×10^{-3} *M*. What are the corresponding values of pOH and pH? (remember sig figs)