

2nd Semester Final Review - Acids and Bases

- What is the pH scale and how is it useful? **pH is a measure of the H^+ concentration in a solution. It tells us how acidic or basic a solution is.**
- If the concentration of $[H^+]$ in blood is $4.0 \times 10^{-8} M$, is blood acidic, basic, or neutral?
Slightly basic pH = 7.39
- What is the pOH of blood?
POH = 14 - pH pOH = 6.6
- What is the equivalence point and how does it relate to neutralization? **The point in a titration when enough of the acid (or base) has been added to react exactly with the base (or acid) being titrated.**
- In a titration, 34.0 mL of 1.50 M NaOH neutralized 52.0 mL of a Hydrochloric Acid solution. What is the concentration of HCl? **0.98 M HCl**
- What is the difference between a monoprotic, diprotic and a triprotic acid? **Monoprotic has only one H^+ to donate, diprotic has two, and triprotic has three.**
- How do conjugate acid-base pair relate? Provide an example and label all components.
**A conjugate acid is the base after accepting the proton. $H^+ + NH_3$ (base) \rightarrow NH_4^+ (conj acid).
A conjugate base is the acid after losing the proton. $HCl \rightarrow H^+ + Cl^-$ (conj base)**
- Provide an example of a strong and weak acid and how it relates to the K_a .
**Strong acid HCl, H_2SO_4 . These acids ionize completely in water. They have very large K_a values
Weak acid $HC_2H_3O_2$. These acids only ionize slightly in water. They have small K_a values.**

9. How are K_w , K_a and K_b related?

$$K_w = K_a K_b$$

10. Calculate the pH for the following solutions and identify as an acid or base

	Ion concentration	pH	Acid or Base
a.	$[H^+] = 6.5 \times 10^{-12}$	11.9	Base
b.	$[H^+] = 3.3 \times 10^{-2}$	1.48	Acid

11. Calculate the pH for the following solutions and identify as an acid or base.

	Ion concentration	pOH	pH	Acid or Base
a.	$[OH^-] = 3.4 \times 10^{-10}$	9.47	4.53	Acid
b.	$[OH^-] = 2.6 \times 10^{-4}$	3.59	10.41	Base

12. Use the given pH to determine the remaining values.

	pH	Acid or Base	pOH	$[H^+]$	$[OH^-]$
a.	11.80	Base	2.2	$1.58 \times 10^{-12} M$	$6.31 \times 10^{-3} M$
b.	4.25	Acid	9.75	$5.62 \times 10^{-5} M$	$1.78 \times 10^{-10} M$

13. Fill in the table

	Solution	Name	$[H^+]$	$[OH^-]$	pH	pOH	acid or base
a.	$3.2 \times 10^{-4} M HCl$	Hydrochloric Acid	3.2×10^{-4}	3.13×10^{-11}	3.49	10.51	Acid
b.	$5.6 \times 10^{-2} M NaOH$	Sodium Hydroxide	1.8×10^{-13}	5.6×10^{-2}	12.75	1.25	Base
c.	$3.1 \times 10^{-3} M Ba(OH)_2$	Barium Hydroxide	1.6×10^{-12}	6.2×10^{-3}	11.8	2.2	Base
d.	$1.5 \times 10^{-5} M H_2SO_4$	Sulfuric Acid	3.0×10^{-5}	3.3×10^{-10}	4.52	9.48	Acid