

Strong and Weak Acids and Bases

1. What is the difference between a strong acid and a weak acid?
2. Give examples two strong and two weak acids.
3. Explain why a conductivity test can be used to determine whether an acid is strong or weak.
4. How are the ionization equations for strong and weak acids written differently? Give example equations to illustrate your point.
5. What is the difference between a strong and a weak base? Give an example of a strong base. Where is it commonly used outside of the lab? Give an example of a common weak base. Where is it commonly used?
6. Why do bases feel slippery?
7. Answer p. 267 #5,9

pH

1. Describe the pH scale.
2. What does it mean that the pH scale is logarithmic? e.g. how does pH 10 compare to pH 11 in terms of hydronium ion concentration? How about pH 10 to pH 7?
3. What is meant by the self-ionization of water? Give an equation to illustrate.
4. How do you calculate the concentration of a strong acid?
5. What is meant by pOH?
6. How do you convert from pOH to pH?
7. What is the benefit of using a universal indicator?
8. Answer p. 276#4

Strong and Weak Acids and Bases

1. What is the difference between a strong acid and a weak acid?
 - Strong acid ionizes completely, weak only does partially
2. Give examples two strong and two weak acids.
 - strong: hydrochloric, sulfuric, hydroiodic, nitric, hydrobromic
 - weak: acetic, citric (organic acids)
3. Explain why a conductivity test can be used to determine whether an acid is strong or weak.
 - Determines the [ions] in a solution and therefore tells how much an acid ionizes
4. How are the ionization equations for strong and weak acids written differently? Give example equations to illustrate your point.
 - \rightarrow vs. \leftrightarrow
5. What is the difference between a strong and a weak base? Give an example of a strong base. Where is it commonly used outside of the lab? Give an example of a common weak base. Where is it commonly used?
 - Strong dissociate completely e.g. NaOH used in drain/oven cleaners
 - weak only partially e.g. Ammonia used in floor/window cleaners
6. Why do bases feel slippery?
 - They react with fats in skin to form soap
7. Answer p. 267 #5,9
 - #5 – test solution with conductivity tester
 - #9

pH

- Describe the pH scale.
 - <7 = acidic, 7 = neutral, >7 = basic
- What does it mean that the pH scale is logarithmic? e.g. how does pH 10 compare to pH 11 in terms of hydronium ion concentration? How about pH 10 to pH 7?
 - one pH unit = $\times 10$ change in concentration
 - 10 to 11 – 10x fewer hydronium ions
 - 10 to 7 – 1000x more hydronium ions
- What is meant by the self-ionization of water? Give an equation to illustrate.
 - $\text{H}_2\text{O}(\text{l}) + \text{H}_2\text{O}(\text{l}) \leftrightarrow \text{H}_3\text{O}^+(\text{aq}) + \text{OH}^-(\text{aq})$
 - in pure water, $[\text{H}_3\text{O}^+] = [\text{OH}^-] = 10^{-7}$
- How do you calculate the concentration of a strong acid?
 - $\text{pH} = -\log [\text{H}_3\text{O}^+]$
 - $= -\log 10^{-7}$
 - $= 7$
 - For strong monoprotic acids, $[\text{acid}] = [\text{H}_3\text{O}^+]$ because they ionize completely
 - example: $[\text{HCl}] = 3 \times 10^{-4} \text{ mol/L} = [\text{H}_3\text{O}^+]$
 - reverse calculation
 - $[\text{H}_3\text{O}^+] = 10^{-\text{pH}}$
 - pH is a measure of the hydronium ion concentration
- What is meant by pOH?
 - A measure of the hydroxide ion concentration
 - $\text{pOH} = -\log[\text{OH}^-]$
- How do you convert from pOH to pH?
 - $\text{pH} + \text{pOH} = 14$
- What is the benefit of using a universal indicator?
 - A single indicator is able to tell the pH of a solution within one pH unit
- Answer p. 276#4
 - #4 a) 2.52 b) 10.77 c) 11.6 d) 1.10 e) 2.7 f) 9.3