

What are Acid-Base Properties and pH?

Worksheet

Acids release H ions; bases accept them. $\text{pH} = \log[\text{H}^+]$; lower pH means more acidic. Buffer solutions resist pH change by containing a weak acid-base conjugate pair.

$$\text{pH} = -\log_{10}[\text{H}^+]$$

Questions

1. If $[\text{H}^+] = 1.1 \times 10^{-10} \text{ M}$, the pH is:

- A) 5
- B) 10
- C) 10
- D) 0.00001

2. $\text{pH} < 7$ indicates:

- A) Basic
- B) Neutral
- C) Acidic
- D) Buffer

3. A buffer resists:

- A) Temperature change
- B) Pressure change
- C) pH change
- D) Concentration change

4. Which is a strong acid?

- A) Acetic acid
- B) Citric acid
- C) Hydrochloric acid
- D) Ammonia

5. If $[\text{H}^+] = 1.1 \times 10^{-10} \text{ M}$, what is the pH?

6. A solution has pH 9. Is it acidic or basic?

7. If $\text{pH} = 2$, calculate $[\text{H}^+]$.

8. Define: What is an acid?

9. Define: What is a base?

10. Define: What does pH measure?

Answer Key

1. A) $5 - \text{pH} = \log(110) = 5$.
2. C) Acidic - $\text{pH} < 7$ is acidic; more H than OH.
3. C) pH change - A buffer maintains a relatively constant pH when small amounts of acid or base are added.
4. C) Hydrochloric acid - HCl is a strong acid (nearly 100% ionization). The others are weak acids or a base.
5. $\text{pH} = \log[\text{H}] = \log(110) \text{ pH} = (3) = 3$
6. $\text{pH} > 7$ means basic The solution is basic (alkaline) Common examples: household ammonia, baking soda solution
7. $\text{pH} = \log[\text{H}] \ 2 = \log[\text{H}] \ \log[\text{H}] = 2 \ [\text{H}] = 10 = 0.01 \text{ M}$
8. A substance that donates protons (H ions) or accepts electron pairs.
9. A substance that accepts protons (H ions) or donates electron pairs.
10. The concentration of hydrogen ions (H); $\text{pH} = \log[\text{H}]$.

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