

## Acid-Base Reactions Quiz Answer Key PDF

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**Which of the following is an example of a Lewis base?**

- A. HCl
- B. NH<sub>3</sub> ✓**
- C. H<sub>2</sub>SO<sub>4</sub>
- D. NaCl

**Which of the following are examples of weak acids? (Select all that apply)**

- A. Acetic acid ✓**
- B. Hydrochloric acid
- C. Citric acid ✓**
- D. Sulfuric acid

**Which of the following are characteristics of a neutralization reaction? (Select all that apply)**

- A. Formation of water ✓**
- B. Formation of salt ✓**
- C. Release of hydrogen gas
- D. Increase in pH

**According to the Arrhenius theory, what do acids produce in aqueous solutions?**

- A. OH<sup>-</sup> ions
- B. H<sup>+</sup> ions ✓**
- C. Electrons
- D. Neutrons

**What is the role of a buffer solution?**

- A. To increase the pH of a solution
- B. To decrease the pH of a solution
- C. To resist changes in pH ✓**
- D. To neutralize all acids

**What are the possible outcomes of an acid-base titration? (Select all that apply)**

- A. Determination of concentration ✓**
- B. Change in color of an indicator ✓**
- C. Formation of a precipitate
- D. Measurement of pH ✓**

**Describe the role of an indicator in an acid-base titration and how it helps determine the endpoint.**

**An indicator changes color at a specific pH range, signaling the endpoint of the titration when the acid and base have neutralized each other.**

**Discuss the importance of buffer solutions in biological systems, providing an example.**

**Buffers maintain stable pH levels in biological systems, such as blood, which uses bicarbonate buffering to maintain pH around 7.4.**

**What is the pH of a neutral solution at 25°C?**

- A. 0
- B. 7 ✓**
- C. 14
- D. 10

**Which of the following is a characteristic of a strong acid?**

- A. Partially dissociates in water
- B. Completely dissociates in water ✓**
- C. Has a high pH
- D. Accepts protons

Explain how the Brønsted-Lowry theory differs from the Arrhenius theory in defining acids and bases.

The Brønsted-Lowry theory defines acids as proton donors and bases as proton acceptors, while the Arrhenius theory defines acids as substances that produce  $H^+$  ions and bases as those that produce  $OH^-$  ions in water.

Describe the process of calculating the pH of a solution given the concentration of hydrogen ions.

pH is calculated as the negative logarithm (base 10) of the hydrogen ion concentration:  $pH = -\log[H^+]$ .

Explain why the pH scale ranges from 0 to 14 and what each end of the scale represents in terms of acidity and basicity.

The pH scale ranges from 0 to 14 because it is based on the ionization constant of water ( $K_w = 1 \times 10^{-14}$ ). A pH of 0 indicates high acidity, while a pH of 14 indicates high basicity.

Explain the difference between a strong acid and a weak acid in terms of dissociation in water.

Strong acids completely dissociate in water, releasing all their hydrogen ions, while weak acids only partially dissociate, releasing fewer hydrogen ions.

What is the primary product formed when an acid reacts with a base?

- A. Hydrogen gas
- B. Salt and water ✓**
- C. Carbon dioxide
- D. Oxygen

What is the pH of a solution with a hydrogen ion concentration of  $1 \times 10^{-3} M$ ?

- A. 3 ✓**
- B. 7
- C. 10
- D. 14

Which of the following is a common indicator used in acid-base titrations?

- A. Phenolphthalein ✓
- B. Litmus
- C. Bromine
- D. Chlorine

Which of the following substances can act as a buffer? (Select all that apply)

- A. A mixture of acetic acid and sodium acetate ✓
- B. Pure water
- C. A mixture of ammonia and ammonium chloride ✓
- D. Hydrochloric acid

Which of the following are strong acids? (Select all that apply)

- A. HCl ✓
- B. H<sub>2</sub>SO<sub>4</sub> ✓
- C. CH<sub>3</sub>COOH
- D. HNO<sub>3</sub> ✓

Which of the following statements are true about bases? (Select all that apply)

- A. They accept protons ✓
- B. They have a pH greater than 7 ✓
- C. They donate electrons
- D. They produce OH<sup>-</sup> ions in water ✓