

Name _____

Concepts in Acids and Bases Answer Key

1. An acid is a substance that donates hydrogen ions (H^+) in a chemical reaction. An example of a common household acid is vinegar (acetic acid).
2. A strong acid completely dissociates in water, releasing all of its hydrogen ions. A weak acid only partially dissociates, releasing a fraction of its hydrogen ions. An example of a strong acid is hydrochloric acid (HCl), while acetic acid (CH_3COOH) is an example of a weak acid.
3. pH is a measure of the concentration of hydrogen ions (H^+) in a solution. It indicates the acidity or alkalinity of a substance. A pH below 7 is acidic, a pH of 7 is neutral, and a pH above 7 is basic or alkaline.
4. The chemical formula for hydrochloric acid is HCl . It is a strong acid that is corrosive and typically found in stomach acid.
5. A base is a substance that accepts hydrogen ions (H^+) or donates hydroxide ions (OH^-) in a chemical reaction. An example of a common household base is baking soda (sodium bicarbonate, $NaHCO_3$).
6. An acidic solution has a pH below 7, a basic solution has a pH above 7, and a neutral solution has a pH of 7.
7. An indicator is a substance that changes color depending on the pH of a solution. An example is phenolphthalein, which is colorless in acidic solutions and pink in basic solutions.
8. Neutralization is a chemical reaction between an acid and a base, resulting in the formation of water and a salt. An example is the reaction between hydrochloric acid (HCl) and sodium hydroxide ($NaOH$) to form water (H_2O) and sodium chloride ($NaCl$).
9. The autoionization of water is the process by which water molecules can ionize into hydrogen ions (H^+) and hydroxide ions (OH^-). K_w is the ionization constant of water and represents the product of the concentrations of H^+ and OH^- ions in water. At 25 degrees Celsius, K_w is equal to 1×10^{-14} .
10. Conjugate acids and bases are related pairs of substances that differ by the presence or absence of a proton (H^+). For example, the conjugate acid of ammonia (NH_3) is ammonium ion (NH_4^+), and the conjugate base of hydrochloric acid (HCl) is chloride ion (Cl^-).