

Investigation 6.C: Differentiating between Weak and Strong Acids and Bases Answer Key

Answer to Analysis Question

1. $C_{12}H_{22}O_{11}(aq)$ (neutral molecular): No conductivity, pH 7, no change to litmus paper, no reaction with metal strips.

$NaCl(aq)$ (neutral ionic): Strong conductivity, pH 7, no change to litmus paper, no reaction with metal strips.

0.10 mol/L $HCl(aq)$ (strong acid): Strong conductivity, pH approximately 2, turns blue litmus red, reacts vigorously with metal strips to produce hydrogen gas (bubbles).

0.10 mol/L $NaOH(aq)$ (strong base): Strong conductivity, pH approximately 13, turns red litmus blue, no reaction with metal strips.

0.10 mol/L $CH_3COOH(aq)$ (weak acid): weak conductivity, pH approximately 4.5, turns blue litmus red, reacts slowly with metal strips to produce hydrogen gas (bubbles).

0.10 mol/L $NH_3(aq)$ (weak base): weak conductivity, pH approximately 8.5, turns red litmus blue, no reaction with metal strips.

Answer to Conclusion Question

2. Strong acids: high conductivity, low pH, and vigorous reaction with magnesium or zinc.
Strong bases: high conductivity, high pH, and no reaction with magnesium or zinc.
Weak acids: low conductivity, pH slightly below 7, and slow reaction with magnesium or zinc.
Weak bases: low conductivity, pH slightly above 7, and no reaction with magnesium or zinc.
Neutral ionic solutions: high conductivity, pH of 7, and no reaction with magnesium or zinc.
Neutral molecular solutions: no conductivity, pH of 7, and no reaction with magnesium or zinc.