

7.1 The characteristic properties of acids and bases

Name: _____ Class: _____ Date: _____

Total: 8 marks

KEY WORDS acid 酸 • ethanoic acid 乙酸 • salt 盐 • base 碱 • weak acid 弱酸

Objective

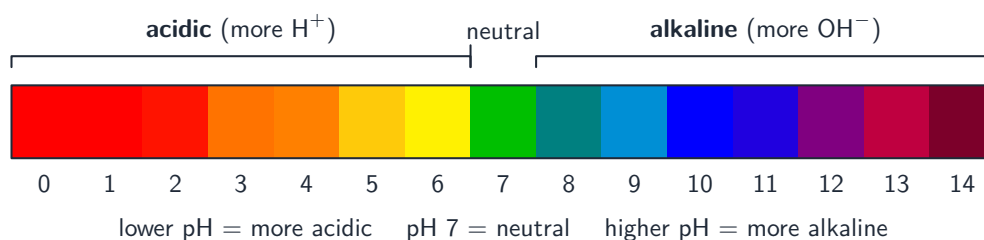
Build the skills to answer exam questions on **acids and bases** 酸与碱 — their reactions, **indicators** 指示剂, **strong/weak acids** 强酸/弱酸, and the **pH scale** pH 值.

You must be able to:

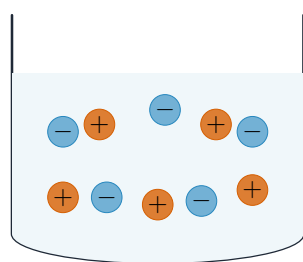
- give the three reactions of acids and the reaction of bases
- use indicator colours and the pH scale
- explain strong vs weak in terms of dissociation

1 Worked examples

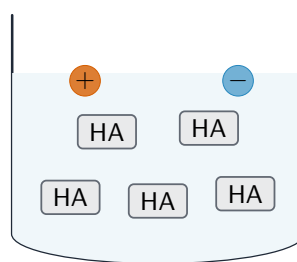
■ pH and acid strength



Below 7 acidic, 7 neutral, above 7 alkaline; acids contain H^+ , alkalis contain OH^-



strong acid
fully split into ions (e.g. HCl)



weak acid
mostly molecules, few
ions (e.g. ethanoic acid)

Strong = fully dissociated (HCl); weak = only partly dissociated (ethanoic acid)

- acid + metal $\rightarrow$ salt + hydrogen; acid + carbonate $\rightarrow$ salt + water + CO₂.

2 Practice

2.1 Give the products when an acid reacts with a carbonate. [1]

2.2 State the colour of litmus in an alkali. [1]

3 Exam-style questions

3.1 A solution with a pH of 2 is: [1]

- **A** strongly alkaline
 - **B** neutral
 - **C** weakly acidic
 - **D** strongly acidic
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3.2 Hydrochloric acid is a strong acid and ethanoic acid is a weak acid.

(a) Explain the difference between a strong and a weak acid. [2]

(b) Write an equation showing the dissociation of hydrochloric acid in water. [1]

3.3 Magnesium reacts with dilute sulfuric acid. Name the two products. [2]

Solutions

2.1 a salt + water + carbon dioxide.

2.2 blue.

3.1 D. pH 2 is strongly acidic.

3.2 (a) a strong acid is fully dissociated (split into ions) in water; a weak acid is only partly dissociated.

(b) $\text{HCl}(aq) \rightarrow \text{H}^+(aq) + \text{Cl}^-(aq)$.

3.3 magnesium sulfate; hydrogen.