

Exercise walk-through

7.1

The characteristic properties of acids and bases

IGCSE Chemistry

Acids and their reactions

An **acid** forms H^+ in water.

- metal $\rightarrow$ **salt** + hydrogen (**effervescence**)
- **base** $\rightarrow$ salt + water (**neutralisation**)
- **carbonate** $\rightarrow$ salt + water + CO_2

You cannot see hydrogen – write **effervescence**, not “hydrogen is given off”.

Describing what you see

Naming the products is only half of what the exam wants.

“State the observations” asks what you would **see with your eyes**, and it carries its own marks – so learn the words on the next slide.

Indicators

An **indicator** is a dye that changes colour.

- **litmus** – red in acid, blue in alkali
- methyl orange – red in acid, yellow in alkali
- thymolphthalein – colourless in acid, blue in alkali

Strong vs weak acids

A **strong acid** (HCl, H_2SO_4 , HNO_3) is fully ionised. A **weak acid** (ethanoic) is only partly ionised, so at the same concentration it has a higher pH and reacts more slowly.

The pH scale

- with **metals** : acid + metal $\rightarrow$ a **salt** + **hydrogen**
- with bases: acid + **base** $\rightarrow$ a salt + water (this is **neutralisation**)
- with **carbonates** : acid + carbonate $\rightarrow$ a salt + water + **carbon dioxide**

Exercises 2.1·2.2

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

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

Exercises 2.1·2.2

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

[1]

2.1

- acid + carbonate → **salt + water + carbon dioxide**

2.2 State the colour of litmus in an alkali.

[1]

2.2

- litmus in alkali is **blue**

Exercise 3.1

3.1 A solution with a pH of 2 is:

[1]

☐

A strongly alkaline

B neutral

C weakly acidic

D strongly acidic

Exercise 3.1

3.1 A solution with a pH of 2 is:

[1]

☐

A strongly alkaline

B neutral

C weakly acidic

D strongly acidic

3.1 D

- pH 2 is **strongly acidic**
- A is pH 12–14; B is pH 7; C is about pH 4–6

Exercise 3.2 (a)

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]

Exercise 3.2 (a)

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]

(a)

- a **strong** acid is **fully dissociated** in water
- a **weak** acid is only **partly dissociated**

Exercise 3.2 (b)

3.2 Hydrochloric acid is a strong acid and ethanoic acid is a weak acid.

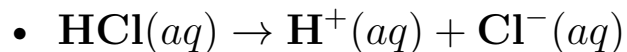
(b) Write an equation showing the dissociation of hydrochloric acid in water. [1]

Exercise 3.2 (b)

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

(b)



Exercise 3.3

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

[2]

Exercise 3.3

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[2]

3.3

- magnesium + sulfuric acid → **magnesium sulfate** and **hydrogen**