

Acids, bases and salts

1. (a) Citric acid produces hydrogen ions in aqueous solution.

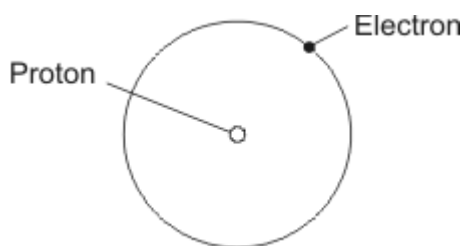
These ions can be represented as $H^+(aq)$.

Complete this sentence.

The (aq) means that the acid has been dissolved in

(1)

- (b) The diagram represents a hydrogen atom, H.



Use the diagram to explain why a hydrogen ion, H^+ , is a proton.

.....

(1)

- (c) Citric acid is a *weak* acid.

Draw a ring around the correct answer to complete the sentence.

The word *weak* means that the acid

has a low boiling point.

is dilute.

is partially ionised in water.

(1)

- (d) A student measured the pH of four acids, **A**, **B**, **C** and **D**.

The acids were the same concentration. The same quantity of magnesium ribbon was added to each of the acids. The volume of gas produced after 5 minutes was recorded.

The results are shown in the table.

Acid	pH	Volume of gas in cm^3
A	2	18
B	5	6
C	1	24
D	4	12

(i) State **one** way in which the student made sure that the experiment was fair.
 (1)

(ii) Use the results to arrange the acids, **A, B, C** and **D** in order of **decreasing** acid strength.
 Most acidic Least acidic. (1)

(e) When acids react with alkalis, the hydrogen ions from the acid react with the hydroxide ions from the alkali.

(i) Which **one** of the following represents the formula of a hydroxide ion?
 Draw a ring around your answer.
 H^- O^- OH^- (1)

(ii) Draw a ring around the correct answer to complete the sentence.
 A solution with more hydrogen ions than hydroxide ions is
 acidic.
 alkaline.
 neutral. (1)
(Total 7 marks)

2. Salts can be prepared by the reaction of acids with alkalis.

(a) (i) The reactions of acids with alkalis can be represented by the equation below. Choose a substance from the box to complete the equation.

carbon dioxide hydrogen oxygen

acid + alkali → salt + (1)

(ii) Draw a ring around the word which best describes the reaction.
displacement neutralisation oxidation reduction (1)

Unit C2, C2.6.2

(b) Sodium sulphate is an important salt.

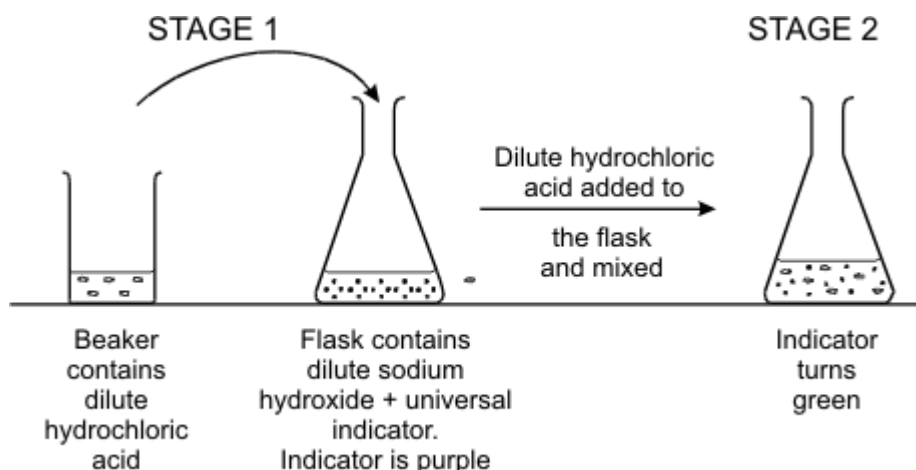
The table gives a list of some substances.

Put a tick (✓) next to the names of the acid **and** the alkali that would react to make sodium sulphate.

Substances	(✓)
Hydrochloric acid	
Nitric acid	
Potassium sulphate	
Sodium hydroxide	
Sodium nitrate	
Sulphuric acid	

(2)
(Total 4 marks)

3. The diagrams show what happens when an acid is added to an alkali.



(a) What is present in the flask at stage 2, besides universal indicator and water?

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(1)

(b) Write an ionic equation to show how water is formed in this reaction and state the sources of the ions.

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(3)
(Total 4 marks)