Identification of Ions and Gases

Question Paper 6

Level	IGCSE
Subject	Chemistry
Exam Board	CIE
Topic	Acids, Bases and Salts
Sub-Topic	Identification of Ions and Gases
Paper Type	Alternative to Practical
Booklet	Question Paper 6

Time Allowed: **51 minutes**

Score: **/42**

Percentage: **/100**

1 The label below is from a bottle of concentrated lemon drink.

Concentrated lemon drink
Ingredients: Water, sugar, citric acid, preservatives, potassium sorbate (artificial sweetener). Yellow colourings E102 and E104.

(a) What is meant by the term *concentrated*?

.....

[1]

(b) Predict the pH of the lemon drink.

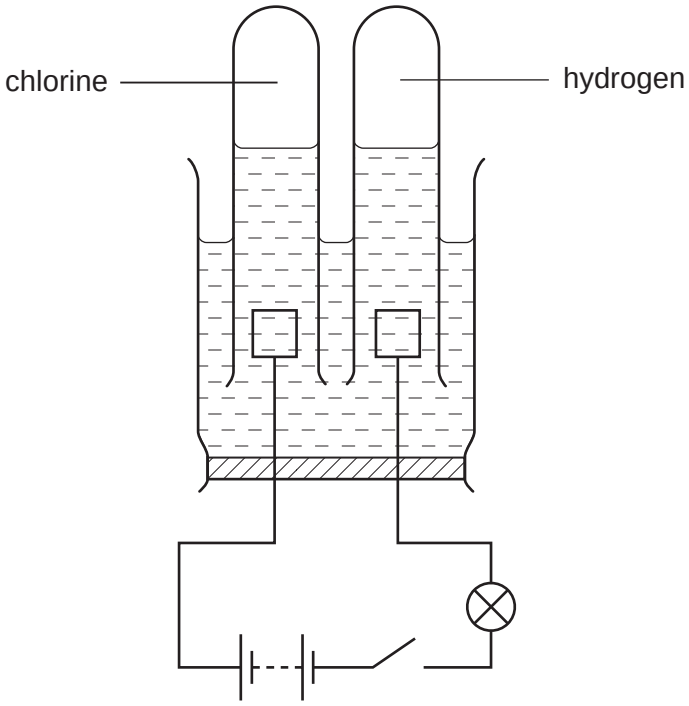
.....

[1]

(c) Describe an experiment to show that two different yellow colourings are present in the drink.

[4]

2 The diagram shows the apparatus used to pass an electric current through concentrated hydrochloric acid.



(a) Label the electrodes. [1]

(b) Give two observations when the current is switched on.

1 .....

2 ..... [2]

(c) Give a test for the product at the negative electrode (cathode).

test .....

result ..... [2]

3 A solid compound **X** was analysed. Solid **X** was an aluminium salt. The tests on **X** and some of the observations are in the following table.

Complete the observations in the table.

tests	observations
(a) One spatula measure of **X** was placed into a hard-glass test-tube. The solid was heated gently then strongly. The gas was tested with pH indicator paper.	condensation at top of tube paper went red
Distilled water was added to **X** and shaken to dissolve. The solution was divided into five portions in test-tubes. **(b) (i)** To the first portion, drops of aqueous sodium hydroxide were added. Excess aqueous sodium hydroxide was then added.	.... [3]
(ii) To the second portion, drops of aqueous ammonia were added. Excess ammonia was then added.	.... [3]
(iii) To the third portion of solution, hydrochloric acid and barium chloride solution were added.	no visible change
(iv) To the fourth portion of solution, nitric acid and lead nitrate solution were added.	no visible change
(v) To the fifth portion, aqueous sodium hydroxide and a spatula measure of aluminium granules were added. The mixture was warmed and the gas tested with indicator paper.	pungent gas paper went blue, pH 10

(c) What does test **(a)** tell you about the gas given off?

.....

[1]

(d) What conclusions can you draw about **X** from tests **(b)(iii)** and **(iv)**?

(b)(iii) .....

(b)(iv) .....

[2]

(e) Identify the gas in **(b)(v)**.

.....

[1]

(f) What conclusions can you draw about substance **X**?

.....

.....

[2]

4 A mixture of two calcium compounds **C** and **D** was tested.

C is partially soluble in water and **D** is soluble in water.

Complete the observations in the table.

tests	observations
The mixture of **C** and **D** was added to distilled water in a boiling tube. The tube was shaken. The mixture was filtered.	
(a) The filtrate was divided into five equal portions.	
(i) To the first portion was added drops of aqueous sodium hydroxide, a little at a time, with shaking.	.... [2]
Excess aqueous sodium hydroxide was added.	..... [1]
(ii) To the second portion was added excess aqueous ammonia, a little at a time.	..... [1]
(iii) To the third portion was added dilute sodium hydroxide and aluminium powder. The mixture was boiled and the gas tested with damp litmus paper.	red litmus went blue
(iv) The pH of the fourth portion was tested with Indicator paper.	pH about 10
(v) Carbon dioxide was bubbled through the fifth portion.	solution turned milky/cloudy

(b) Name the gas given off in **(a)(iii)**.

..... [1]

(c) Suggest an explanation for the observation in **(a)(v)**.

.....

..... [1]

(d) What conclusions can you draw about the identity of the anions in solid **C** and **D**?

.....

..... [2]

5 Describe a chemical test to **distinguish** between each of the following pairs of substances. An example is given.

potassium chloride and potassium iodide

test: add aqueous lead(II) nitrate

result: potassium chloride gives a white precipitate, potassium iodide gives a yellow precipitate

(a) water and ethanol

test .....

result with water .....

result with ethanol ..... [2]

(b) sulphuric acid and aqueous sodium sulphate

test .....

result with sulphuric acid .....

result with aqueous sodium sulphate ..... [2]

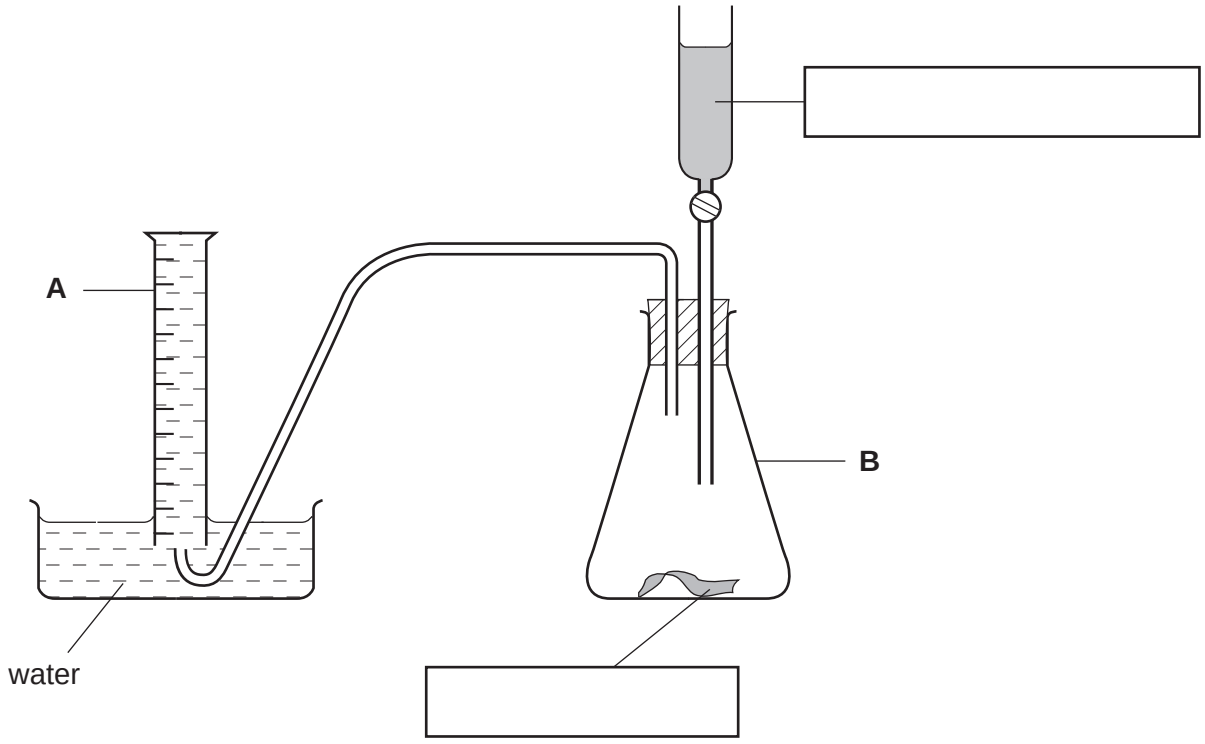
(c) hydrochloric acid and nitric acid

test .....

result with hydrochloric acid .....

result with nitric acid ..... [2]

6 The apparatus below was used to make hydrogen. Dilute hydrochloric acid was added to zinc.



(a) Identify the pieces of apparatus labelled

A, ...

B. ..... [2]

(b) Complete the boxes [1]

(c) Give a test for hydrogen.

test .....

result ..... [2]