

# Identification of Ions and Gases

## Question Paper 5

<b>Level</b>	IGCSE
<b>Subject</b>	Chemistry
<b>Exam Board</b>	CIE
<b>Topic</b>	Acids, Bases and Salts
<b>Sub-Topic</b>	Identification of Ions and Gases
<b>Paper Type</b>	Alternative to Practical
<b>Booklet</b>	Question Paper 5

**Time Allowed:** 57 minutes

**Score:** /47

**Percentage:** /100

- 1 A sample of solid **C** was analysed. **C** is a mixture of two salts, **D** and **E**. Solid **D** is insoluble lead carbonate and solid **E** is water-soluble. The tests on **C**, and some of the observations are in the following table. Complete the observations in the table.

tests	observations
(a) Describe the appearance of <b>C</b> .	pale green solid
(b) Using a spatula, place a little of <b>C</b> in a hard glass test-tube. Inside the top of the tube suspend a piece of damp indicator paper. Heat <b>C</b> gently until gas comes out of the tube.	paper turns blue pH 8 to 11
(c) Using a spatula, place a little of <b>C</b> in a test-tube. Add about 2 cm <sup>3</sup> of dilute nitric acid and test the gas.	..... ..... [3]

Solid **C** was added to a boiling tube containing distilled water. The tube was shaken to mix the contents. The contents of the boiling tube were filtered.

tests on the residue in the filter paper	observations
(d) Place the funnel in a test-tube. Pour dilute nitric acid onto the residue contained in the funnel. Add 2 cm <sup>3</sup> of potassium iodide to the solution collected in the tube.	..... [2]

tests on the filtrate	observations
<p><b>(e)</b> Divide the filtrate into three test-tubes.</p> <p><b>(i)</b> To the first portion add dilute hydrochloric acid and about 1 cm<sup>3</sup> of aqueous barium nitrate.</p> <p><b>(ii)</b> To the second portion of solution add excess aqueous ammonia.</p> <p><b>(iii)</b> To the third portion of solution, add an equal volume of aqueous sodium hydroxide.</p> <p>Warm the mixture gently. Test the gas with indicator paper.</p>	<p>white precipitate</p> <p>green precipitate</p> <p>green precipitate</p> <p>paper turned blue</p> <p>pH 8 to 11</p>

**(f)** Name the gas given off in **(c)**.

..... [1]

**(g)** Name the gas given off in **(e)(iii)**.

..... [1]

**(h)** What conclusions can you draw about salt **E**?

.....

.....

..... [4]

[Total: 11]

- 2 Three different liquids **P**, **Q** and **R** were analysed. **Q** was an aqueous solution of sodium hydroxide.  
The tests on the liquids and some of the observations are in the following table.  
Complete the observations in the table.

tests	observations
<p><b>(a)</b> Test the pH of the liquids using indicator paper. Note the colour of the paper.</p>	<p><b>P</b> colour                      red</p> <p>pH                                      1</p> <p><b>Q</b> colour .....[2]</p> <p>pH .....[2]</p> <p><b>R</b> colour                      orange</p> <p>pH                                      5</p>
<p><b>(b) (i)</b> Add a 5 cm piece of magnesium to about 3 cm<sup>3</sup> of liquid <b>P</b> in a test-tube. Test the gas given off.</p> <p><b>(ii)</b> Repeat <b>(b)(i)</b> using liquids <b>Q</b>, and <b>R</b>. Do not test for any gases.</p>	<p>bubbles of gas</p> <p>lighted splint pops</p> <p><b>Q</b> .....</p> <p><b>R</b> .....[2]</p>

tests	observations
<p><b>(c)</b> To about 2 cm<sup>3</sup> of liquid <b>P</b> add 1 spatula measure of sodium carbonate. Test the gas given off.</p>	<p>.....</p> <p>.....</p> <p>..... [3]</p>
<p><b>(d)</b> By using a teat pipette add aqueous silver nitrate to about 1 cm<sup>3</sup> of liquid <b>P</b>.</p>	<p>white precipitate</p>
<p><b>(e)</b> By using a teat pipette add liquid <b>Q</b> to about 1 cm<sup>3</sup> of aqueous iron(II) sulphate.</p>	<p>..... [2]</p>

**(f)** Name the gas given off in test **(b)(i)**.

..... [1]

**(g)** Name the gas given off in test **(c)**.

..... [1]

**(h)** Identify liquid **P**.

..... [1]

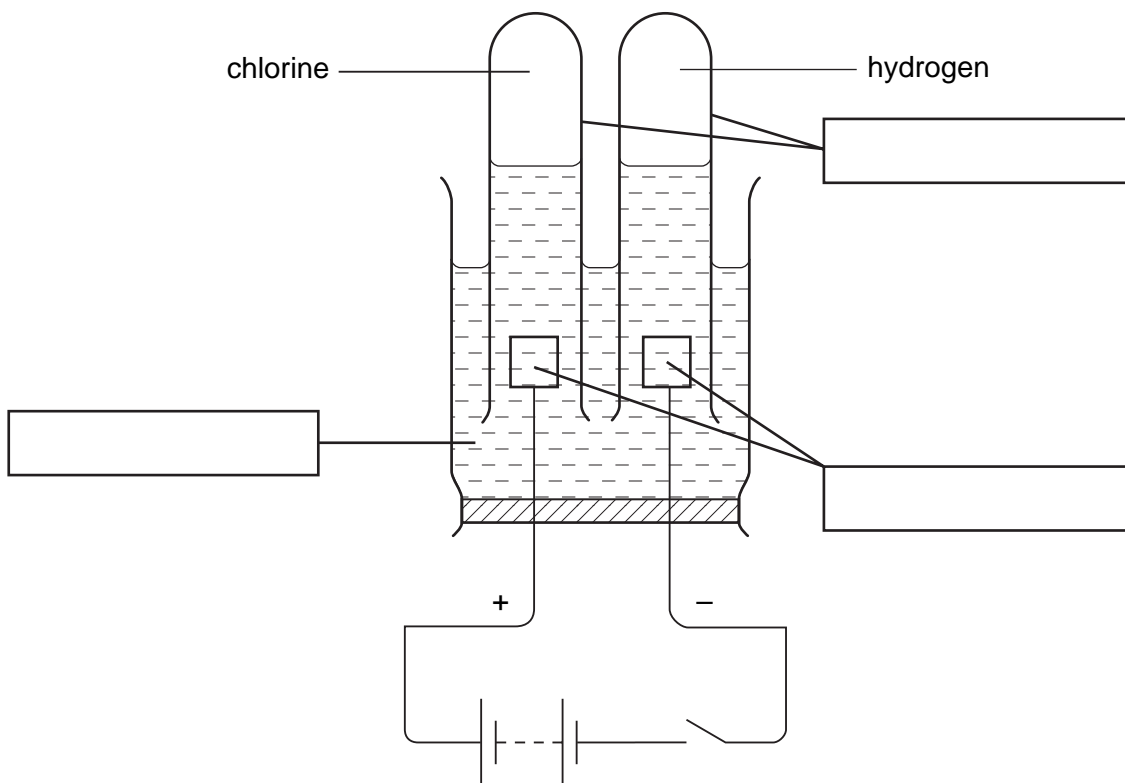
**(i)** What conclusions can you draw about liquid **R**?

.....

..... [2]

[Total: 14]

3 The diagram shows the effect of passing electricity through concentrated hydrochloric acid.



(a) Label the diagram by completing the boxes. [3]

(b) Name this process.

..... [1]

(c) Give a test for chlorine.

test .....

result ..... [2]

4 A sample of orange fruit jam was investigated to check the three colourings present.

Step 1 The jam was boiled with water.

Step 2 The mixture was filtered.

Step 3 The filtrate was concentrated.

Step 4 The concentrate was analysed by chromatography.

(a) What was the purpose of Step 1?

..... [1]

(b) Why was the mixture filtered?

..... [1]

(c) How was Step 3 carried out?

..... [1]

(d) Draw a diagram to show the possible paper chromatogram obtained in Step 4.

[2]

- 5 A mixture of two compounds, **B** and **C**, was tested. Compound **B** was a water-soluble zinc salt and compound **C** was insoluble. The tests and some of the observations are in the following table. Complete the observations in the table.

tests	observations
<p>(a) One measure of the mixture was heated gently then strongly.</p> <p>The gas released was tested with cobalt chloride paper.</p>	<p>condensation at the top of the tube</p> <p>paper turned pink</p>
<p>The rest of the mixture was added to about 25 cm<sup>3</sup> of distilled water in a boiling tube. The contents of the tube were shaken and filtered. The following tests were carried out.</p>	
<p><b>Tests on the filtrate</b> The solution was divided into 2 cm<sup>3</sup> portions in four test-tubes.</p>	
<p>(b) (i) Drops of aqueous sodium hydroxide were added to the first portion of the solution.</p> <p>Excess aqueous sodium hydroxide was added.</p>	<p>.....</p> <p>.....</p> <p>.....[3]</p>
<p>(ii) Using the second portion test (b)(i) was repeated using aqueous ammonia instead of aqueous sodium hydroxide.</p> <p>(iii) To the third portion of solution was added hydrochloric acid and barium nitrate solution.</p>	<p>.....</p> <p>.....</p> <p>.....[3]</p> <p>white precipitate</p>



tests	observations
(iv) To the fourth portion of solution was added nitric acid and silver nitrate solution.	no visible reaction
<b>Tests on the residue</b>	
(c) Some of the residue was placed into a test-tube. Dilute hydrochloric acid was added and the gas given off was tested with limewater.	rapid effervescence limewater turned milky

(d) What does test (a) indicate?

..... [1]

(e) What conclusions can you draw about compound B?

.....  
..... [2]

(f) What does test (c) indicate?

.....  
..... [2]