

# Identification of Ions and Gases

## Question Paper 7

<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 7

**Time Allowed:** 47 minutes

**Score:** /39

**Percentage:** /100

1 Salt **E**, which is ammonium chloride was tested.

Record all observations in the table.

tests	observations
<b>(a)</b> Describe the appearance of <b>E</b>	..... [2]
<b>(b)</b> Using a spatula salt <b>E</b> was placed in a hard glass test-tube. Inside the top of the tube was suspended a piece of damp blue litmus paper next to a piece of damp red litmus paper. <b>E</b> was heated gently until gas came out of the tube.	red litmus went blue then blue litmus went red
<p><b>(c)</b> <b>E</b> was dissolved in water to make an aqueous solution.</p> <p>The solution was divided into three test-tubes</p> <p><b>(i)</b> To the first portion, was added a few drops of dilute nitric acid and about 1cm<sup>3</sup> of aqueous silver nitrate.</p> <p><b>(ii)</b> To the second portion of solution <b>E</b>, was added about 1 cm<sup>3</sup> of lead nitrate solution.</p> <p><b>(iii)</b> To the third portion of solution <b>E</b>, was added about 1 cm<sup>3</sup> of aqueous sodium hydroxide. The mixture was boiled gently and the gas given off was tested with indicator paper</p>	<p>..... [2]</p> <p>..... [2]</p> <p>..... [2]</p>

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

..... [1]

**(e)** Explain the observations in test **(b)**.

..... [2]

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

oxygen and carbon dioxide

test: glowing splint

result: re-lights in oxygen, no effect with carbon dioxide

- (a) aqueous chlorine and aqueous sodium chloride

test .....  
result with chlorine .....  
result with sodium chloride ..... [2]

- (b) aqueous iron(II) chloride and aqueous iron(III) chloride

test .....  
result with iron(II) chloride .....  
result with iron(III) chloride ..... [2]

- (c) copper sulphate and copper carbonate

test .....  
result with copper sulphate .....  
result with copper carbonate ..... [2]

**3 Forged Banknote**

A fake banknote can be investigated by dissolving the ink off the paper.

You are provided with four different inks from four different criminals. Describe an experiment to show which one of these inks is the same as the ink from the banknote.

You can use a labelled diagram to help you answer the question.

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.....

[6]

- 4 A mixture of two solid compounds **D** and **E** was analysed. Solid **D** was a zinc salt which is soluble in water. Solid **E** was an insoluble metal carbonate. The tests on the mixture and some of the observations are in the following table.  
Complete the observations in the table.

tests	observations
<p><b>(a)</b> About half of the mixture of <b>D</b> and <b>E</b> was placed in a test-tube. The mixture was heated</p>	<p>green to black condensation formed</p>
<p><b>(b)</b> The rest of the mixture of <b>D</b> and <b>E</b> was added to distilled water in a boiling tube. The contents of the tube were filtered. The filtrate and the residue were kept for the following tests.</p>	
<p style="text-align: center;"><i>test on residue</i></p> <p><b>(c)</b> The residue was transferred from the filter paper in to a test-tube. About 3 cm<sup>3</sup> of dilute sulphuric acid was added. The gas was tested with limewater.</p>	<p>.....</p> <p>.....</p> <p>.....[2]</p>
<p>The solution obtained in <b>(c)</b> was divided into two equal portions.</p> <p><b>(d) (i)</b> To the first portion was added excess aqueous sodium hydroxide, a little at a time.</p> <p><b>(ii)</b> To the second portion was added excess aqueous ammonia, a little at a time.</p>	<p>pale blue precipitate</p> <p>.....</p> <p>.....</p> <p>.....[4]</p>

tests	observations
<p style="text-align: center;"><i>test on filtrate</i></p> <p><b>(e)</b> The filtrate from <b>(b)</b> was divided into three approximately equal portions.</p> <p><b>(i)</b> To the first portion were added drops of aqueous sodium hydroxide, a little at a time with shaking.</p> <p>Excess aqueous sodium hydroxide was added.</p> <p><b>(ii)</b> To the second portion was added excess aqueous ammonia a little at a time.</p> <p><b>(iii)</b> To the third portion were added drops of dilute hydrochloric acid and aqueous barium chloride.</p>	<p>.....</p> <p>.....[2]</p> <p>.....[1]</p> <p>.....</p> <p>.....</p> <p>.....[3]</p> <p>white precipitate</p>

**(f)** What conclusions can you draw about the identity of solid **D**?

.....

.....[2]

**(g)** What conclusions can you draw about the identity of the cation in solid **E**?

.....

.....[2]