

Identification of Ions and Gases

Question Paper 2

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 2

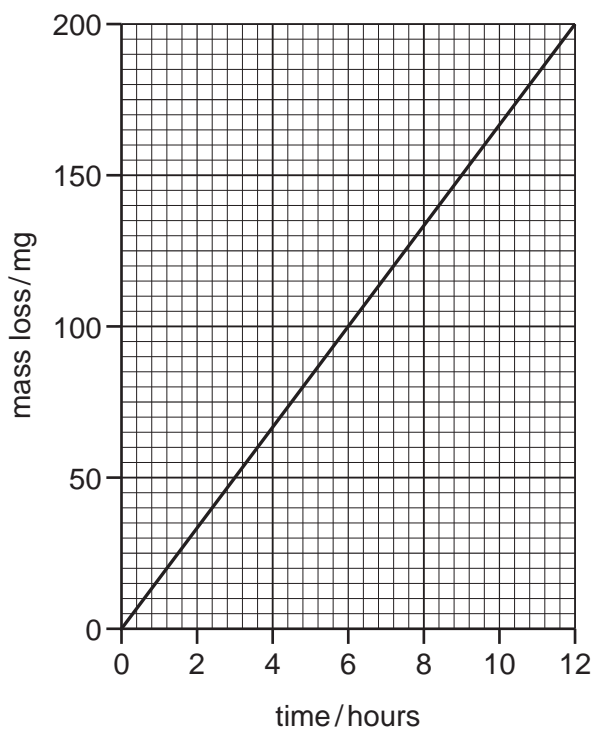
Time Allowed: 57 minutes

Score: /47

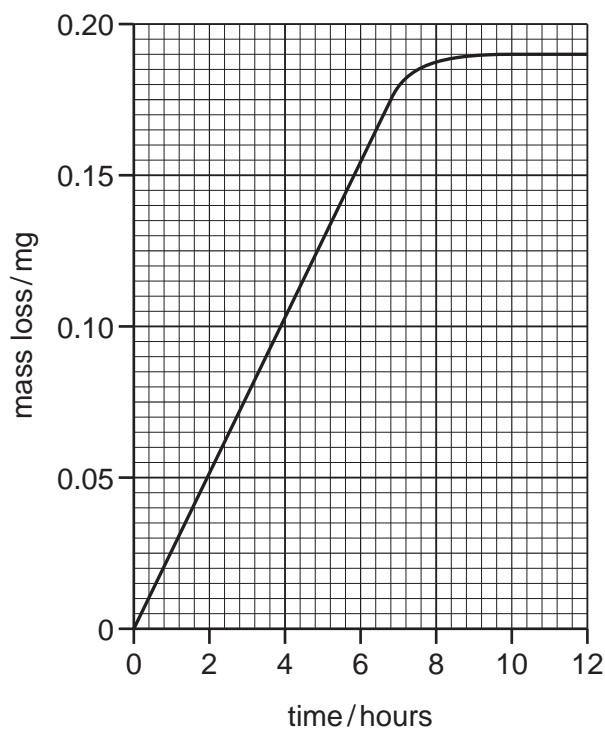
Percentage: /100

- 1 Identical pieces of steel were placed in two different boiling liquids for 12 hours. The graphs show how the mass of each piece of steel changed.

graph A
steel in boiling acid solution



graph B
steel in boiling alkali solution



- (a) Give **one** similarity in the change in mass of the steel in both liquids.

..... [1]

- (b) Describe **two** ways in which the mass loss shown in graph A is different from that shown in graph B.

1.

.....

2.

..... [3]

- (c) State **two** different safety precautions that would need to be taken when carrying out this investigation.

1.

2. [2]

[Total: 6]

- 2 Two liquids, **L** and **M**, were analysed. **L** was aqueous potassium iodide. **M** was a colourless liquid.

The tests on the liquids and some of the observations are in the following table.

Complete the observations in the table.

tests	observations
<p><u>tests on liquid L</u></p> <p>(a) Appearance of liquid L.</p>	<p>..... [1]</p>
<p>Liquid L was divided into three equal portions in separate test-tubes.</p> <p>(b) (i) An iodine crystal was added to the first portion of liquid L. The test-tube was stoppered and the contents shaken.</p> <p>(ii) An equal volume of liquid M was added to the test-tube, the contents shaken and left to stand for five minutes.</p>	<p>liquid turned orange</p> <p>two layers were formed, pink top layer and orange lower layer</p>
<p>(c) To the second portion of liquid L, dilute nitric acid and barium nitrate solution were added.</p>	<p>..... [1]</p>
<p>(d) To the third portion of liquid L, dilute nitric acid and silver nitrate solution were added.</p>	<p>..... [2]</p>

- (e) Why does the colour of liquid **L** change in test (b)(i)?

.....
 [1]

- (f) What conclusions can you draw about liquid **M** from test (b)(ii)?

.....
 [2]

[Total: 7]

- 3 A mixture of two solids, **M** and **N**, was analysed.
 Solid **M** was zinc sulfate which is water-soluble and solid **N** was insoluble.
 The tests on the mixture, and some of the observations, are in the table.
 Complete the observations in the table.

tests	observations
Distilled water was added to the mixture in a boiling tube and shaken. The contents of the tube were filtered and the filtrate and residue kept for the following tests.	
<u>tests on the filtrate</u> The filtrate was divided into four portions.	
<p>(a) (i) Drops of aqueous sodium hydroxide were added to the first portion of the filtrate. Excess aqueous sodium hydroxide was then added.</p> <p>(ii) Drops of aqueous ammonia were added to the second portion of the filtrate. Excess aqueous ammonia was then added.</p>	<p>.....</p> <p>..... [3]</p> <p>.....</p> <p>..... [2]</p>
<p>(b) About 1 cm³ of dilute nitric acid followed by silver nitrate solution was added to the third portion of the filtrate.</p>	<p>..... [1]</p>
<p>(c) About 1 cm³ of dilute nitric acid followed by barium nitrate solution was added to the fourth portion of the filtrate.</p>	<p>..... [2]</p>

tests	observations
<u>tests on the residue</u> (d) Appearance of the residue.	black solid
(e) Dilute hydrochloric acid was added to a little of the residue. The mixture was heated and the gas given off was tested with damp blue litmus paper.	effervescence pungent gas, bleached litmus paper
(f) Aqueous hydrogen peroxide was added to a little of the residue. The gas given off was tested.	effervescence glowing splint relit

(g) Identify the gas given off in test **(e)**.

..... [1]

(h) Identify the gas given off in test **(f)**.

..... [1]

(i) What conclusions can you draw about solid **N**?

.....

..... [2]

[Total: 12]

- 4 Two different liquids, **M** and **N**, were analysed. **N** was aqueous potassium iodide. The tests on the liquids and some of the observations are in the following table. Complete the observations in the table.

tests	observations
<p>(a) (i) Appearance of liquid M.</p> <p>(ii) Appearance of liquid N.</p>	<p>colourless liquid with an antiseptic smell</p> <p>..... [2]</p>
<p>(b) (i) A few drops of M were transferred to a dry watch glass. The liquid was touched with a lighted splint.</p> <p>(ii) Test (b)(i) was repeated using liquid N.</p> <p>(c) A little of liquid M was added to a crystal of iodine in a test-tube. The test-tube was shaken.</p> <p>(d) To a little of liquid N, a few drops of dilute nitric acid was added, followed by silver nitrate solution.</p>	<p>burns with a yellow flame</p> <p>..... [1]</p> <p>orange-brown solution</p> <p>..... [2]</p>

- (e)** What type of substance is liquid **M**?

.....

..... [2]

[Total: 7]

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

tests	observations
<p>(a) (i) Appearance of the liquids.</p> <p>(ii) The pH of the liquids was tested using Universal Indicator paper.</p>	<p>P [1]</p> <p>Q colourless, smell of vinegar</p> <p>R colourless, no smell</p> <p>P [1]</p> <p>Q pH5</p> <p>R pH7</p>
<p>(b) A piece of magnesium ribbon was added to a little of each liquid. The gas given off by liquid P was tested.</p>	<p>P [2]</p> <p>Q slow effervescence</p> <p>R no reaction</p>
<p>(c) To a little of liquid P, hydrochloric acid and aqueous barium chloride were added.</p>	<p>..... [2]</p>
<p>(d) Liquid R was heated to boiling in a test-tube. A thermometer was used to record the constant temperature of the vapour produced.</p>	<p>temperature = 100 °C</p>

- (e)** What conclusions can you draw about liquid **Q**?

..... [2]

- (f)** Identify liquid **R**.

..... [1]

[Total: 9]

6 Three bottles of liquids have lost their labels.

The liquids are known to be:

aqueous sodium iodide,

hexene,

dilute nitric acid.

Outline chemical tests you could use to distinguish between the liquids in the three bottles.

liquid	test	result
aqueous sodium iodide
hexene
dilute nitric acid

[6]

[Total: 6]