

# Tests for Ions & Gases

## Question Paper

Level	GCSE
Subject	Chemistry
Exam Board	Edexcel IGCSE
Module	Double Award (Paper 1C)
Topic	Chemistry of the Elements
Sub-Topic	Tests for Ions & Gases
Booklet	Question Paper

**Time Allowed:** 47 minutes

**Score:** /39

**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	75%	70%	60%	55%	50%	<50%

# Edexcel (I)GCSE

## Chemistry

Double Award (Paper 1C)

### Chemistry of The Elements: Tests for Ions & Gases

**Total Marks: 39**

**You must have:**

**Ruler**

**Calculator**

**Instructions:**

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Use black ink or ball-point pen.

Answer All questions.

Answer the questions in the spaces provided there may be more space than you need

Show all the steps in any calculations and state the units.

**Information:**

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The total mark for this paper is 39

The marks for each question are shown in brackets use this as a guide as to how much time to spend on each question.

**Advice:**

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Read each question carefully before you start to answer it.

Keep an eye on the time.

Write your answers neatly and in good English.

Try to answer every question.

Check your answers if you have time at the end.

1 Ammonium chloride contains oppositely charged ions.

(a) State the formula of each ion.

(2)

Positive ion .....

Negative ion .....

(b) (i) Describe a chemical test to show that a substance contains ammonium ions.

(3)

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.....

(ii) Describe a chemical test to show that a substance contains chloride ions.

(3)

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(c) Ammonium chloride decomposes when heated:

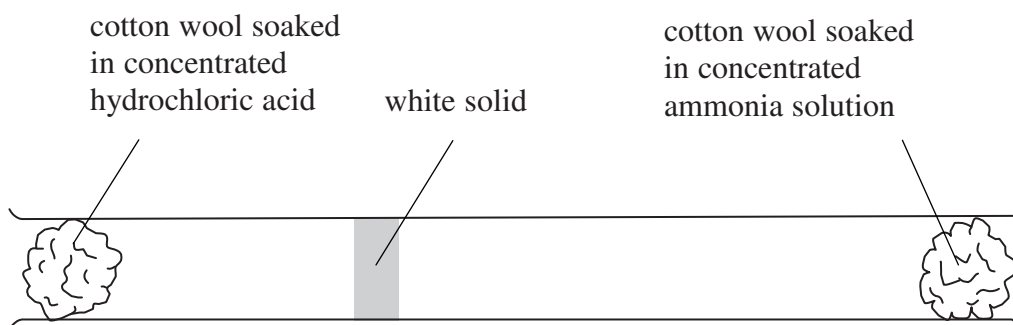


What does the  $\rightleftharpoons$  symbol indicate about the reaction?

(1)

.....  
.....

(d) The reaction between ammonia and hydrogen chloride can be used to illustrate diffusion with the following apparatus.



After a few minutes, a white solid appears inside the tube.

(i) Identify the white solid.

(1)

(ii) What does the diagram show about the speed of the ammonia molecules compared to the speed of the hydrogen chloride molecules?

(1)

(e) State the main hazard when using concentrated hydrochloric acid in the experiment in (d).

Suggest **one** precaution you could use to minimise this hazard.

(2)

Hazard .....

Precaution .....

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**(Total for Question 1 = 13 marks)**

2 Like other metals, iron is malleable and is a good conductor of electricity.

(a) (i) Explain why iron is malleable.

(2)

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(ii) Explain why iron is a good conductor of electricity.

(2)

.....

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(b) Iron forms two sulfates.

One has the formula  $\text{FeSO}_4$  and the other has the formula  $\text{Fe}_2(\text{SO}_4)_3$

The addition of sodium hydroxide solution can be used to distinguish between solutions of these sulfates.

(i) State what would be observed in each case.

(2)

$\text{FeSO}_4$  .....

.....

$\text{Fe}_2(\text{SO}_4)_3$  .....

.....

(ii) Write a chemical equation for the reaction of iron(II) sulfate ( $\text{FeSO}_4$ ) with sodium hydroxide solution.

(2)

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**(Total for Question 2 = 8 marks)**

3 A student carried out a series of tests on a solid, **M**, in order to identify the ions that could be present.

The table shows her results.

Test	Method	Result
Test 1	Carry out a flame test on solid <b>M</b>	Lilac flame
Test 2	Dissolve solid <b>M</b> in water, and divide the solution into three portions, A, B and C	
	Portion A – add dilute sodium hydroxide solution	Green precipitate
	Portion B – add dilute hydrochloric acid, then barium chloride solution	No change
	Portion C – add dilute nitric acid, then silver nitrate solution	Yellow precipitate

(a) Identify the ion responsible for

(3)

(i) the lilac colour in the flame test

.....

(ii) the green precipitate when sodium hydroxide solution was added

.....

(iii) the yellow precipitate when silver nitrate solution was added

.....

(b) Describe how the student should carry out a flame test on solid **M**.

(3)

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(c) (i) Why was dilute nitric acid added to the solution of solid **M** before using silver nitrate solution?

(1)

.....

(ii) Why should dilute hydrochloric acid **not** be used in place of dilute nitric acid in this test?

(2)

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.....

.....

(d) The tests for negative ions that the student carried out involved precipitation.

Suggest **one** negative ion that cannot be identified by a precipitation reaction.

(1)

.....

**(Total for Question 3 = 10 marks)**

4 A student was asked by his teacher to perform a flame test on a solid.

He used this method.

- dip the tip of a clean platinum wire into hydrochloric acid and then into the solid
- adjust the air hole of the Bunsen burner to obtain a non-roaring, non-luminous Bunsen flame
- place the tip of the platinum wire into the edge of the flame
- observe the colour in the flame

(a) (i) Why is it important that the platinum wire is clean?

(1)

(ii) Why is it important to use a non-luminous flame?

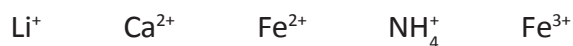
(1)

(iii) What colour would be observed in the flame if the solid contained sodium ions?

(1)



(b) Another student was given a pale violet solid. He was told that it contained two cations (positive ions) from this list



He performed a flame test on the solid.

He then dissolved a small sample of the solid in water. A yellow solution was formed.

He added sodium hydroxide solution and then warmed the mixture.

The table shows his observations.

Test	Observation
flame test	no positive result
add sodium hydroxide solution and warm	brown precipitate a pungent-smelling gas was evolved the gas turned damp red litmus paper blue

(i) The flame test gave no positive result.

State the two cations from the list that are **not** present in the solid.

(1)

..... and .....

(ii) Identify the pungent-smelling gas given off and explain why the red litmus paper must be damp before it is used.

(2)

.....  
.....  
.....  
.....

(iii) Identify the two cations present in the pale violet solid.

(2)

..... and .....

**(Total for Question 4 = 8 marks)**