



Resources available from

**kickstart
tutors**

Student number

--	--	--	--	--

Name _____

Date _____

Attempt/Time taken _____

GCSE CHEMISTRY

Topic Paper: 8.2 & 8.3 Identification of gases and ions
Part 2

Time allowed: 25 minutes

Materials

For this paper you must have:

- the Periodic Table/Data Sheet, provided as an insert (enclosed)
- a ruler with millimetre measurements
- a calculator, which you are expected to use where appropriate.

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- All working must be shown.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The Periodic Table/Data Sheet is provided as in insert.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions you need to make sure that your answer:
 - is clear, logical, sensibly structured
 - fully meets the requirements of the question
 - shows that each separate point or step supports the overall answer.



22 Marks



Q6. Four bottles of chemicals made in the 1880s were found recently in a cupboard during a Health and Safety inspection at Lovell Laboratories.



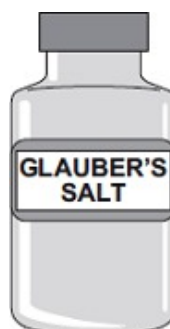
Sodium carbonate



Sodium chloride



Sodium nitrate



Sodium sulfate

The chemical names are shown below each bottle.

(a) You are provided with the following reagents:

aluminium powder

barium chloride solution acidified with dilute hydrochloric acid

dilute hydrochloric acid

silver nitrate solution acidified with dilute nitric acid

sodium hydroxide solution.

limewater

red litmus paper

(i) Describe tests that you could use to show that these chemicals are correctly named.

In each case give the reagent(s) you would use **and** state the result.

Test and result for carbonate ions:

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



Test and result for chloride ions:

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

Test and result for nitrate ions:

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

Test and result for sulfate ions:

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

(4)

(ii) Suggest why a flame test would **not** distinguish between these four chemicals.

.....

(1)

(b) Instrumental methods of analysis linked to computers can be used to identify chemicals.

Give **two** advantages of using instrumental methods of analysis.

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

(2)

(Total 7 marks)



Q7. A student investigated an egg shell.



Trish Steel [CC-BY-SA-2.0], via Wikimedia Commons

(a) The student did some tests on the egg shell.

The student's results are shown in the table below.

Test		Observation
1	Dilute hydrochloric acid was added to the egg shell.	A gas was produced. The egg shell dissolved, forming a colourless solution.
2	A flame test was done on the colourless solution from test 1.	The flame turned red.
3	Sodium hydroxide solution was added to the colourless solution from test 1.	A white precipitate formed that did not dissolve in excess sodium hydroxide solution.
4	Silver nitrate solution was added to the colourless solution from test 1.	A white precipitate formed.

(i) The student concluded that the egg shell contains carbonate ions.

Describe how the student could identify the gas produced in test 1.

.....

.....

.....

.....

(2)



(ii) The student concluded that the egg shell contains aluminium ions.

Is the student's conclusion correct? Use the student's results to justify your answer.

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

(2)

(iii) The student concluded that the egg shell contains chloride ions.

Is the student's conclusion correct? Use the student's results to justify your answer.

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

(2)

(b) Some scientists wanted to investigate the amount of lead found in egg shells. They used a modern instrumental method which was *more sensitive* than older methods.

(i) Name **one** modern instrumental method used to identify elements.

.....
.....

(1)

(ii) What is the meaning of *more sensitive*?

.....
.....

(1)

(Total 8 marks)



Q8. The colours of fireworks are produced by chemicals.



© Igor Sokalski/iStock/Thinkstock

(a) Information about four chemicals is given in the table.

Complete the table below.

Chemical	Colour produced in firework
barium chloride	green
..... carbonate	crimson
sodium nitrate
calcium sulfate	red

(2)

(b) Describe a test to show that barium chloride solution contains chloride ions.

Give the result of the test.

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

(2)



(c) A student did two tests on a solution of compound **X**.

Test 1

Sodium hydroxide solution was added.
A blue precipitate was formed.

Test 2

Dilute hydrochloric acid was added.
Barium chloride solution was then added.
A white precipitate was formed.

The student concluded that compound **X** is iron(II) sulfate.

Is the student's conclusion correct?

Explain your answer.

.....

.....

.....

.....

.....

.....

(3)
(Total 7 marks)