



Rewarding Learning

General Certificate of Secondary Education  
2013–2014

## Double Award Science: Chemistry

Unit C1

Foundation Tier

[GSD21]



THURSDAY 14 NOVEMBER 2013, MORNING

### TIME

1 hour.

### INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.

Answer **all nine** questions.

### INFORMATION FOR CANDIDATES

The total mark for this paper is 70.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question **4(d)**.

A Data Leaflet which includes a Periodic Table of the Elements is provided.



8921

Centre Number

71

Candidate Number

For Examiner's use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	

Total Marks

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1 Sodium is a soft metal which is easily cut with a knife.

(a) How is sodium stored in the laboratory?

\_\_\_\_\_ [1]

(b) Describe the appearance of the surface of a piece of freshly cut sodium.

\_\_\_\_\_ [1]

(c) What happens to the freshly cut surface if the piece of sodium is left in the air?

\_\_\_\_\_ [2]

To demonstrate the reaction of sodium with water a **small** piece of sodium is placed into the water using **tongs**.

(d) Suggest why it is safer to:

(i) use a small piece of sodium rather than a large piece

\_\_\_\_\_  
\_\_\_\_\_ [1]

(ii) lift the sodium with tongs rather than handle it using your fingers.

\_\_\_\_\_  
\_\_\_\_\_ [1]

Examiner Only

Marks

Remark

2 The table below contains definitions of five different chemical terms.

Complete the table by choosing a chemical term from the list below which matches each definition.

hydrated                      immiscible                      distillate                      solute  
miscible                      insoluble                      solvent                      residue

Definition	Chemical term
a liquid which will dissolve a solid	
a solid which will not dissolve in water	
liquids which do not mix but form a series of layers	
the solid left after a mixture of a solid and a liquid is filtered	
a liquid which has been condensed from a vapour during distillation	

[5]

Examiner Only

Marks      Remark

3 A method to find out the boiling point of water is given below.

- Measure 150 cm<sup>3</sup> of water
- Pour the water into a 250 cm<sup>3</sup> beaker
- Heat the beaker using a Bunsen burner
- Record the temperature when the water boils.

(a) Draw a labelled diagram of the assembled apparatus used to boil the water and record the temperature.

[5]

(b) Name a piece of apparatus which can be used to measure 150 cm<sup>3</sup> of water.

[1]

Water contains some dissolved oxygen.

(c) What happens to the dissolved oxygen as the water is heated?

[1]

Examiner Only	
Marks	Remark

4 Rock salt is a mixture of sodium chloride (salt) and sand.

(a) What is the chemical formula of sodium chloride?

\_\_\_\_\_ [1]

(b) Describe the appearance of pure dry sodium chloride.

\_\_\_\_\_ [2]

(c) Why is sodium chloride described as a compound?

\_\_\_\_\_  
\_\_\_\_\_ [2]

**In part (d) you will be assessed on your written communication skills including the use of specialist scientific terms.**

(d) Describe the practical steps you would take to

(i) separate a mixture of sodium chloride and sand

(ii) obtain a dry sample of sodium chloride


• You should mention the apparatus used in each step.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [6]

Examiner Only	
Marks	Remark

5 Jewellery is generally made from gold alloys rather than pure gold.

The table below gives some information about different gold alloys and pure gold.

Alloy	% gold	% other metals e.g. copper, silver, nickel	Price per gram /£	Hardness
9 carat	37.5	62.5	13	Hardness increases 
14 carat	58.3	41.7	20	
18 carat	75.0	25.0	26	
22 carat	91.6	8.4	31	
24 carat pure gold	100.0	0.0	35	

(a) Use the information in the table to explain why 9 carat gold is an alloy.

\_\_\_\_\_ [2]

(b) Use the information in the table to suggest two reasons why jewellery is **not** made from pure gold.

1. \_\_\_\_\_ [1]

2. \_\_\_\_\_ [1]

(c) (i) Write chemical **symbols** for the four metals copper, silver, nickel and gold.

copper \_\_\_\_\_

silver \_\_\_\_\_

nickel \_\_\_\_\_

gold \_\_\_\_\_ [2]

(ii) Name the area of the Periodic Table where these four metals are found.

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

6 Aluminium is produced on an industrial scale by the electrolysis of aluminium oxide.

(a) Balance the symbol equation below which shows how aluminium is formed from aluminium oxide.



(b) Name the electrode at which aluminium is produced during the electrolysis of aluminium oxide.

\_\_\_\_\_ [1]

(c) Complete the definition of electrolysis by choosing one word from each box. Put a circle round the correct word in each box.

Electrolysis is the

decomposition
production
evaporation

of a

solid
liquid
gas

compound using

heat.
chemicals.
electricity.

[3]

Examiner Only	
Marks	Remark

7 The balanced symbol equation below includes state symbols.



Look at the equation carefully and answer the questions which follow.

(a) Name the product which is dissolved in water.

\_\_\_\_\_ [1]

(b) Name the solid reactant.

\_\_\_\_\_ [1]

(c) Suggest two observations which can be made when the reactants are added together.

1. \_\_\_\_\_ [1]

2. \_\_\_\_\_ [1]

(d) Complete the table below to give information about the elements present in a substance which has the formula  $\text{K}_2\text{CO}_3$ .

Name of element	Number of atoms of the element in the formula

[3]

Examiner Only

Marks Remark



8 This question is about atomic structure.

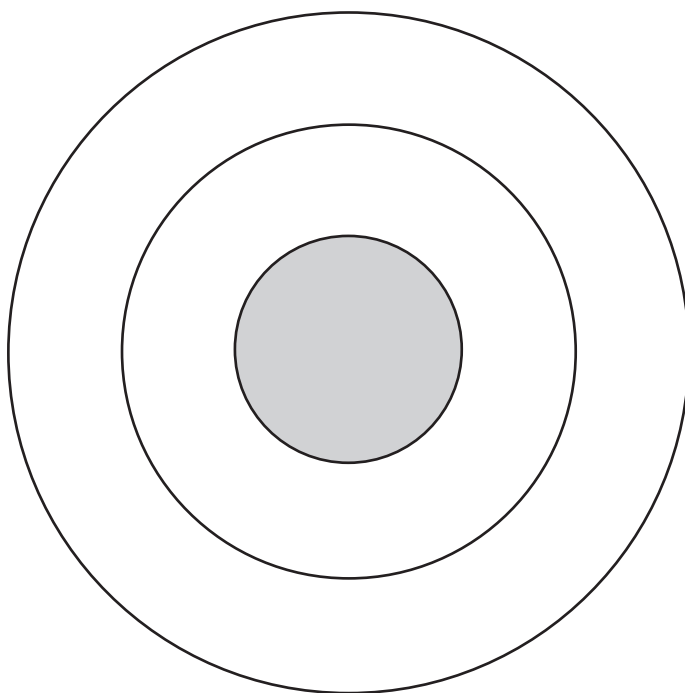
(a) Complete the table to show the relative charge and mass of the different particles found in an atom.

Particle	Relative charge	Relative mass
electron		
proton		
neutron		

[3]

Carbon-12 ( $^{12}_6\text{C}$ ) atoms have 6 electrons, 6 protons and 6 neutrons.

(b) Draw a **labelled** diagram of an atom of carbon-12 ( $^{12}_6\text{C}$ ) to show the **position** and **number** of the electrons, protons and neutrons in the atom.



[4]

(c) Carbon-14 ( $^{14}_6\text{C}$ ) and carbon-12 ( $^{12}_6\text{C}$ ) are isotopes of carbon.

Compare, in terms of the particles in the atoms, an atom of carbon-14 ( $^{14}_6\text{C}$ ) with an atom of carbon-12 ( $^{12}_6\text{C}$ ).

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[3]

Examiner Only

Marks Remark

9 By the 1860s chemists had discovered about 60 elements and were attempting to organise them by looking for patterns. Today, over 100 elements are known and they are arranged in a particular way in the modern Periodic Table.

(a) Explain what is meant by the term element.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [1]

(b) One suggested pattern was called “The Law of Octaves”.

(i) Name the chemist who developed “The Law of Octaves”.

\_\_\_\_\_ [1]

(ii) Complete the sentence to explain what is meant by “The Law of Octaves”.

When elements are arranged in order of their \_\_\_\_\_  
every eighth element has \_\_\_\_\_ [2]

(c) In what order are the elements arranged in the modern Periodic Table?

\_\_\_\_\_ [1]

(d) What names are given to the rows and columns of elements in the modern Periodic Table?

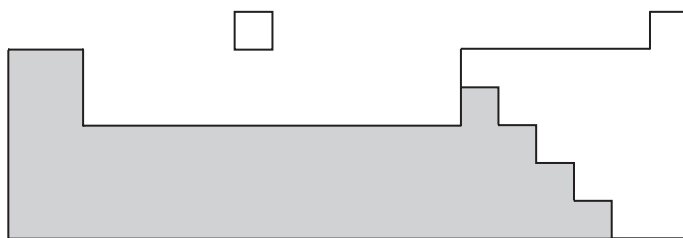
(i) rows \_\_\_\_\_ [1]

(ii) columns \_\_\_\_\_ [1]

Examiner Only

Marks Remark

- (e) The diagram below shows an outline of part of the modern Periodic Table with a shaded area.



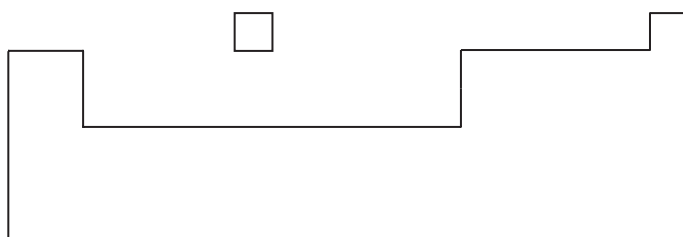
The elements in the shaded area in the diagram have similar physical properties. Give two physical properties of the elements in this area.

1. \_\_\_\_\_ [1]

2. \_\_\_\_\_ [1]

- (f) On the outlines of the Periodic Tables below shade in the area where the:

(i) halogens can be found.



(ii) alkaline earth metals can be found.



[2]

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**THIS IS THE END OF THE QUESTION PAPER**

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Marks

Remark

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