



Rewarding Learning

General Certificate of Secondary Education
2013–2014

Double Award Science: Chemistry

Unit C1

Foundation Tier

[GSD21]



TUESDAY 25 FEBRUARY 2014, 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 **9(b)**.

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

Centre Number

71

Candidate Number

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	

Total Marks

1 Some containers of chemicals have labels, called hazard symbols, to warn of risks or dangers.

(a) For **each** of the hazard symbols below **draw a line** from the symbol to the correct risk or danger.

Hazard Symbol



Risk or Danger

Could poison you



Could cause skin burns



Could cause an explosion



Could cause a fire

Could cause irritation

© Crown Copyright

[4]

Examiner Only	
Marks	Remark

- (b) A student was given a chemical which was in a container labelled with the hazard symbol shown below. The student was asked to find the boiling point of the chemical.



© Crown Copyright

The instructions were:

Put 15cm³ of the chemical into a boiling tube and heat it until it boils. Record the boiling point of the chemical which will be less than 100°C.

The diagrams below show two different methods of carrying out this experiment.



© Martyn F Chillmaid / Science Photo Library

Method 1



© Martyn F Chillmaid / Science Photo Library

Method 2

The student used **Method 2**. Explain why **Method 2** is safer than **Method 1**.

[2]

Examiner Only	
Marks	Remark

- 2 The diagram below shows apparatus used in the laboratory to separate two liquids.



© Jerry Mason / Science Photo Library

Choose words from the list below to complete the sentences which follow.

miscible **colourless** **beaker**
immiscible **filter funnel** **cooking oil**
separating funnel **orange juice**

- (a) The liquids shown are described as _____ . [1]
- (b) The liquid in the bottom layer is water. The liquid in the upper layer could be _____ . [1]
- (c) The liquid can be run out into a _____ . [1]
- (d) The apparatus shown is called a _____ . [1]

Examiner Only	
Marks	Remark

BLANK PAGE
(Questions continue overleaf)

3 The table below gives information about some gases in the air.

gas	formula	% by volume in air	boiling point/°C
argon	Ar	0.93	-185
oxygen	O ₂	21.0	-183
carbon dioxide	CO ₂	0.03	-78
nitrogen	N ₂	78.0	-196
neon	Ne	0.005	-246

(a) Use this information to answer the questions that follow.

(i) Which gas in the table is a compound?

_____ [1]

(ii) Which noble gas, in the table, is the most abundant in the air?

_____ [1]

(iii) Which two gases, in the table, are diatomic?

_____ and _____ [1]

(iv) Which gas, in the table, has the highest boiling point?

_____ [1]

Examiner Only

Marks Remark

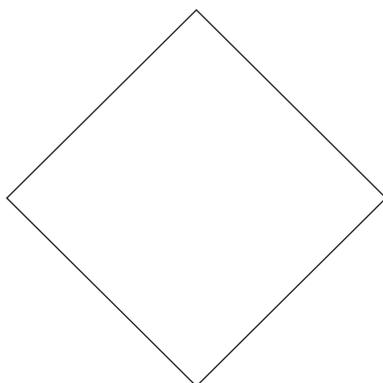
- (b) Complete the table below which gives information about some of the Group 7 elements, called the halogens.

element	state at room temperature	colour	formula
chlorine			Cl ₂
	liquid	red-brown	
iodine		grey	I ₂

[5]

- (c) All containers of halogens have a hazard symbol.

In the space below draw the hazard symbol used on containers of halogens.



[1]

Examiner Only	
Marks	Remark

- 4 (a) The list below gives the names of some common laboratory chemicals.

ethanoic acid sodium hydroxide hydrochloric acid
ammonia sulfuric acid sodium chloride potassium sulfate

Choose, from the list, a chemical which is a:

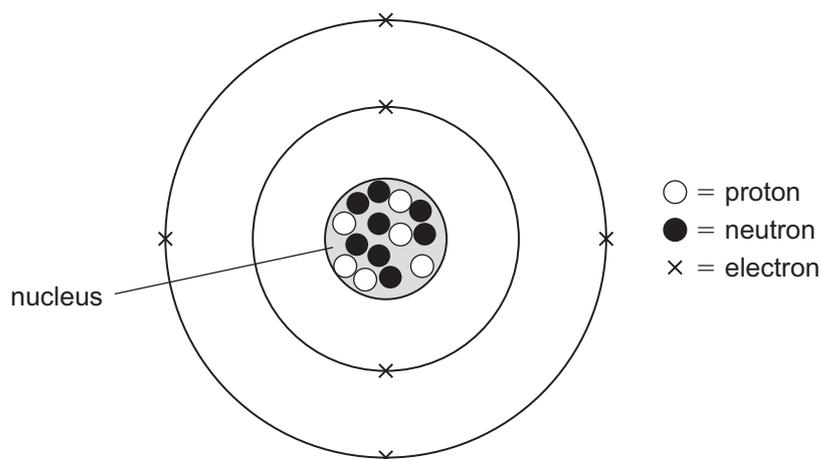
- (i) strong acid _____ [1]
- (ii) weak alkali _____ [1]
- (iii) weak acid _____ [1]
- (b) Complete the sentences below.
- (i) All acids dissolve in water to produce _____ ions. [1]
- (ii) All alkalis dissolve in water to produce _____ ions. [1]
- (c) (i) Complete the general word equation for the reaction between an acid and a base.
- acid + base → _____ + _____ [2]
- (ii) The reaction between an acid and an alkali is described as:
- combustion neutralisation electrolysis**
- Circle the correct answer. [1]

Examiner Only

Marks

Remark

- 5 All elements are made up of atoms. The diagram below shows the structure of an atom of element **Y**. Use the diagram below to answer the questions that follow.



- (a) What is the atomic number of element **Y**?

_____ [1]

- (b) Element **Y** is in Period 2 of the Periodic Table. How does the diagram show this?

_____ [1]

- (c) How many neutrons are there in the atom of **Y** shown in the diagram?

_____ [1]

Element **Y** has two common isotopes.

- (d) (i) What are isotopes?

Isotopes are _____

_____ [2]

- (ii) The diagram shows **one** of the two common isotopes. What is the relative atomic mass of the isotope shown?

_____ [1]

Examiner Only	
Marks	Remark

6 Solid chemical compounds can be many different colours.

black white yellow red green blue

In answering this question each colour may be used once, more than once or not at all.

Choose, from the list, the correct colour of:

sodium chloride _____

hydrated copper(II) sulfate _____

aluminium sulfate _____

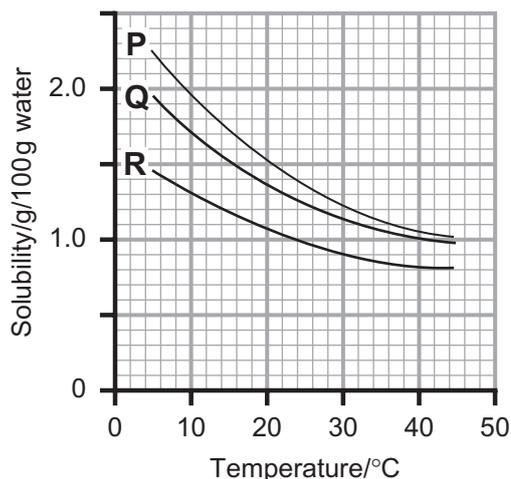
copper(II) carbonate _____ [4]

Examiner Only

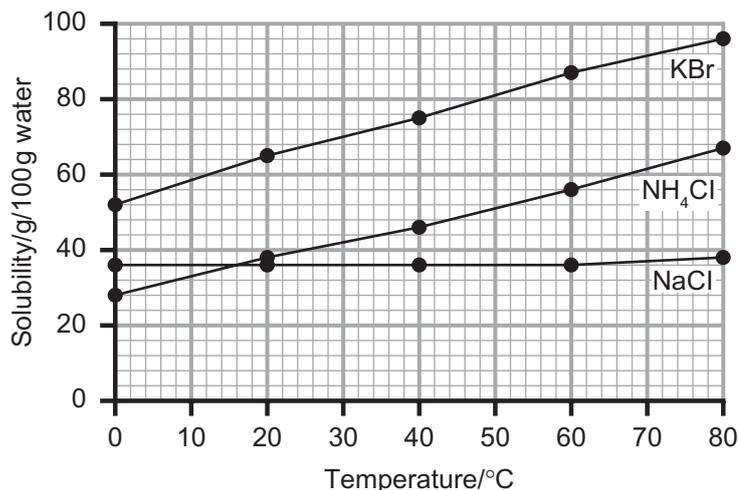
Marks Remark

BLANK PAGE
(Questions continue overleaf)

7 (a) Look at the two graphs below showing solubilities.



graph X



graph Y

© GCSE Chemistry for CCEA by T Lavery & T Quigg, published by Hodder Education, 2011.
ISBN 978 0340 985038. "Reproduced by permission of Hodder Education".

- (i) Describe the **trend** in solubility shown by the substances **P**, **Q** and **R** in graph X.

_____ [2]

- (ii) In what physical state would you expect the substances **P**, **Q** and **R** to be?

_____ [1]

- (iii) Describe the **trends** in solubility for the substances in graph Y.

_____ [2]

- (iv) At what temperature do NaCl and NH₄Cl have the same solubility?

_____ [1]

Examiner Only	
Marks	Remark

Read the following passage and answer the questions that follow.

The river Bush is good for salmon fishing. In summer, after a spell of hot weather, heavy rain caused water from a nearby car park to run into the river. This water was warmed by the hot tarmac and it increased the river water temperature by several degrees.

- (b) (i)** What effect would increased water temperature have on the oxygen levels in the river water?

_____ [1]

- (ii)** Explain how salmon could be affected if the temperature in the river rises.

_____ [2]

Examiner Only	
Marks	Remark

- 8 Aluminium is combined with small amounts of some other elements to produce a new material called **X**. This new material has improved properties making it tougher and stronger than pure aluminium. It has excellent corrosion resistance and very good resistance to seawater.

The table below gives some information about material **X**.

elements used to make X	% by weight	relative atomic mass
aluminium		27
magnesium	0.8	24
silicon	0.6	28
iron	0.7	56
zinc	0.2	65
copper	0.4	64

- (a) Why can **X** be described as an alloy?

_____ [2]

- (b) (i) Calculate the **total** percentage by weight of all the other elements added to aluminium in this alloy.

_____ [1]

- (ii) Calculate the percentage by weight of aluminium in this alloy. Show your working.

_____ % [2]

Examiner Only

Marks Remark

(c) (i) From the information given in the passage opposite and your own knowledge, explain why **X** would be very suitable in the manufacture of aircraft.

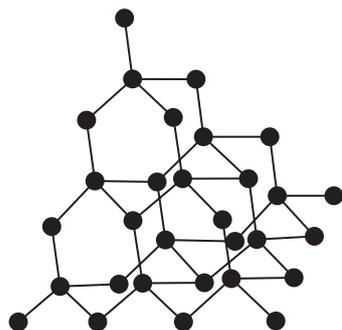
[2]

(ii) Suggest another use for **X** based on the information in the passage and the table.

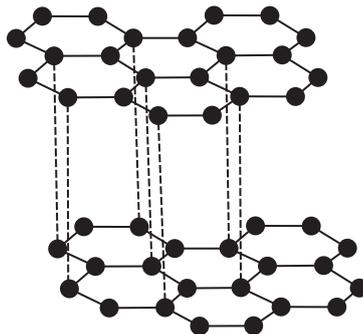
[1]

Examiner Only	
Marks	Remark

9 Two structural models are shown below.



A



B

© *Chemistry in Use* by Roland Jackson, published by Pearson Education Ltd. ISBN 9780582013941.
Further duplication other than for teaching and study is prohibited.

(a) (i) Name a substance which has:

Structure **A** _____

Structure **B** _____ [2]

(ii) What do the black dots in the structural models represent?

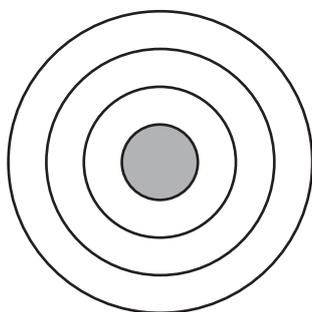
_____ [1]

Examiner Only

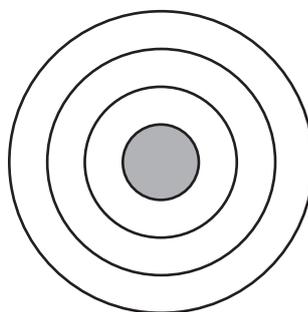
Marks Remark

- (c) (i) Sodium reacts with sulfur to form a compound called sodium sulfide.

Complete the diagrams below to show **all** the electrons in a sodium atom and in a sulfur atom.



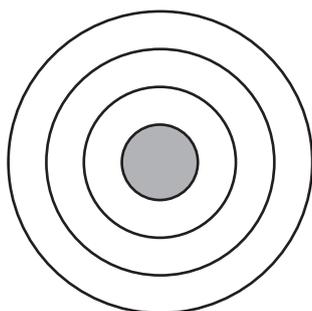
sodium atom



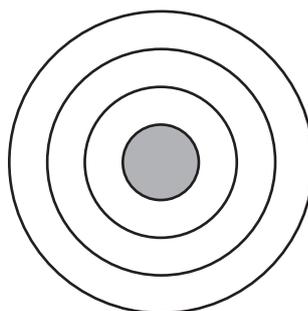
sulfur atom

[2]

- (ii) In the space below draw diagrams to show **all** the electrons in a sodium ion and in a sulfide ion.



sodium ion



sulfide ion

[2]

- (iii) How are the ions held together in sodium sulfide?

_____ [1]

- (iv) What is the chemical formula for sodium sulfide?

_____ [1]

THIS IS THE END OF THE QUESTION PAPER

Examiner Only	
Marks	Remark

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA
will be happy to rectify any omissions of acknowledgement in future if notified.