Rewarding Learning

General Certificate of Secondary Education

Centre Number

Candidate Number

Single Award Science: Chemistry

Unit 2

Foundation Tier

[GSA21]

GSA21

Assessment

TIME

1 hour.

Assessment Level of Control:

Tick the relevant box (✓)

Controlled Conditions	
Other	

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page or on blank pages.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 60.
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(e)**.
A Data Leaflet, which includes a Periodic Table of the Elements, is included for your use.

13234

24GSA2101

1 Some household substances are dangerous and have symbols on their containers.

Source: © Getty Images

(a) What name is given to these symbols?

Circle your answer.

security **universal** **safety** **hazard**

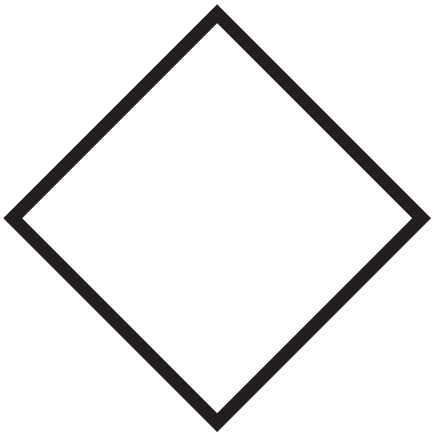
[1]

(b) Give **one** reason why using symbols is better than using words.

_____

_____ [1]

(c) In the box below draw the symbol you would expect to see on a bottle of fly spray that should be used with **caution**.



[1]

BLANK PAGE

DO NOT WRITE ON THIS PAGE

(Questions continue overleaf)

2 Sophie is at the beach with her family. She is playing with a bucket containing a mixture of seawater (salt and water) and sand.

Source: © Getty Images

(a) Complete the following sentences about the mixture.

Choose from:

solvent **solution** **soluble** **insoluble**

Salt is described as a solute because it is _____ in water.

When the salt is dissolved in water, it makes a _____ . [2]

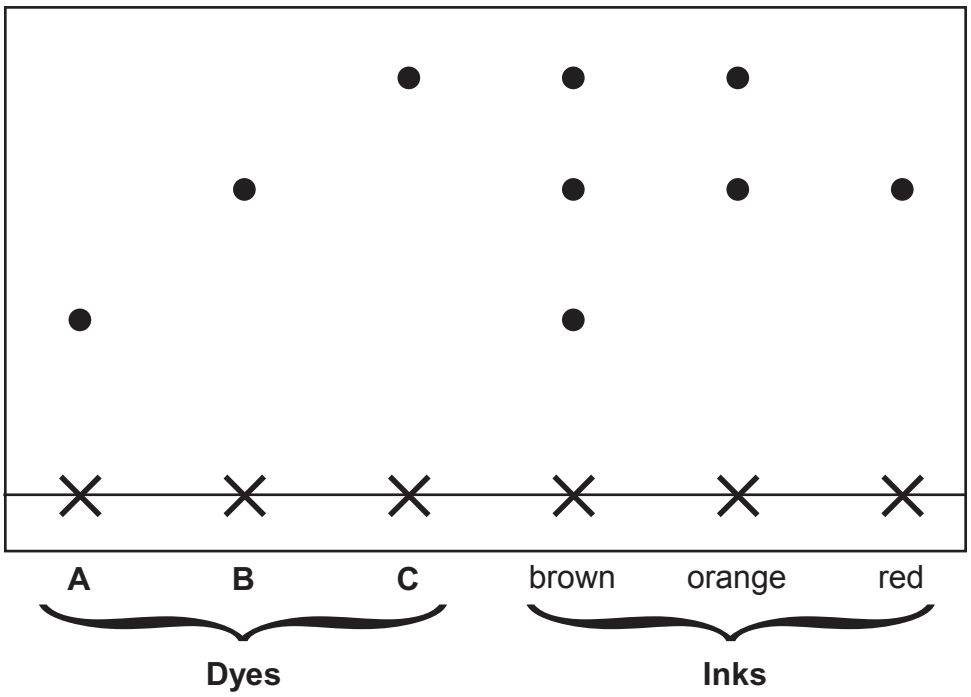
(b) Name the separation technique that would separate the sand from the seawater.

Choose from:

filtration **dissolving** **evaporation**

_____ [1]

(c) A student carried out an investigation to find which dyes (**A**, **B** or **C**) were present in brown, orange and red inks. The results are shown below.



(i) What name is given to this separation technique?

Circle your answer.

chromatography **filtration** **crystallisation**

[1]

(ii) Which dye (**A**, **B** or **C**) is present in **all** three inks?

_____ [1]

(iii) Which dye (**A**, **B** or **C**) is the **least** soluble?

_____ [1]

[Turn over

3 Fingerprints can be taken from a crime scene and used as evidence.

Source: © Getty Images

(a) Below are the steps a scientist might use to take a fingerprint from a white surface at a crime scene. They are **not** in the correct order.

1. brush off excess powder
2. sprinkle carbon black onto the surface
3. transfer the print onto card
4. lift the print with clear tape

(i) Using the numbers **1**, **2**, **3** and **4**, put the steps in the correct order.

_____ _____ _____ _____ [2]

(ii) Explain why aluminium powder is **not** used for fingerprints on a white surface.

_____

_____ [1]

(b) Explain fully why fingerprints can be used to help identify someone who had been at a crime scene.

_____

_____

_____ [2]

(c) Apart from helping to solve crime, give **one** other use for fingerprints.

_____ [1]

[Turn over

4 A teacher is demonstrating a flame test to his class.

Source: © Getty Images

(a) What colour of Bunsen burner flame should be used to carry out the flame test?

_____ [1]

(b) The teacher wants to test two different chemicals using a piece of nichrome wire. Describe fully how he should clean the wire between tests.

_____

_____

_____ [2]

(c) Complete the table below.

Metal ion	Flame colour
calcium	brick red
copper	
	yellow-orange

[2]

5 Five solutions were tested using a pH meter. The results are shown below.

Solution	pH
A	1.0
B	9.6
C	5.8
D	7.0
E	13.9

(a) Which solution (**A**, **B**, **C**, **D** or **E**) is:

a weak acid? _____

a strong alkali? _____ [2]

(b) What colour would universal indicator solution be if it was added to solution **A**?

_____ [1]

(c) Give **one** advantage of testing acids and alkalis using a pH meter rather than using universal indicator.

_____

_____ [1]

(d) Which solution (**A**, **B**, **C**, **D** or **E**) could be pure water?

_____ [1]

(e) A student wants to neutralise solution **A** using the least volume of one of the other solutions. Which solution (**B**, **C**, **D** or **E**) should they choose?

_____ [1]

BLANK PAGE

DO NOT WRITE ON THIS PAGE

(Questions continue overleaf)

6 Magnesium is the eighth most abundant element in the Earth's crust. It can be found in many ores as a compound.

(a) What is meant by the term **compound**?

_____

_____ [2]

(b) The table below shows some magnesium ores and their chemical formula.

Magnesium ore	Chemical formula
magnesite	$MgCO_3$
dolomite	$CaMg(CO_3)_2$
brucite	$Mg(OH)_2$
talc	$Mg_3Si_4O_{10}(OH)_2$

Use information from the table to answer the following questions.

(i) Apart from magnesium, **name** the other element found in **all** of these ores.

_____ [1]

(ii) Name the **metal** that is combined with magnesium in **dolomite**.

_____ [1]

(c) **(i)** How many **elements** are present in magnesite, $MgCO_3$?

_____ [1]

(ii) How many **atoms** are represented by the formula for magnesite, $MgCO_3$?

_____ [1]

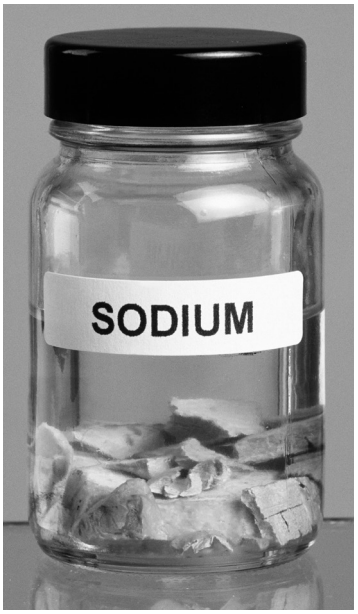
(d) Magnesium carbonate reacts with hydrochloric acid. Complete the word equation for this reaction.

magnesium carbonate + hydrochloric acid ⟶ magnesium chloride + [ ] + [ ]

[2]

[Turn over

7 The photograph below shows some large pieces of sodium stored in a jar of oil.



© Martyn F. Chillmaid / Science Photo Library

Sodium is a Group 1 metal that reacts with water. To demonstrate this reaction, a teacher took a piece of sodium out of the jar to add to a trough of water.

(a) Suggest **one** thing the teacher must do to avoid the reaction being too violent.

_____

_____ [1]

(b) State **one** thing the teacher will see as soon as the sodium is added to water.

_____ [1]

(c) Potassium is another Group 1 metal and it reacts in a similar way with water. What name is given to the Group of the Periodic Table that both potassium and sodium belong to?

_____ [1]

(d) Sodium is represented on the Periodic Table as shown below.

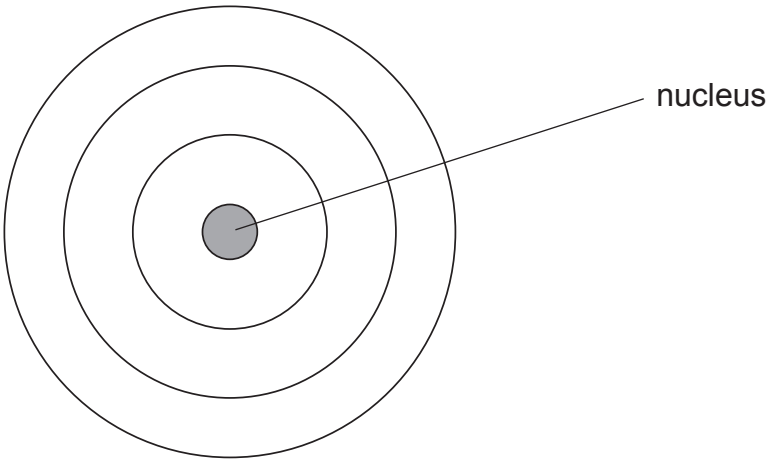
23 Na 11

(i) Complete the table below to show the number of each particle in an atom of sodium.

Particle	Number
electron	11
proton	
neutron	

[2]

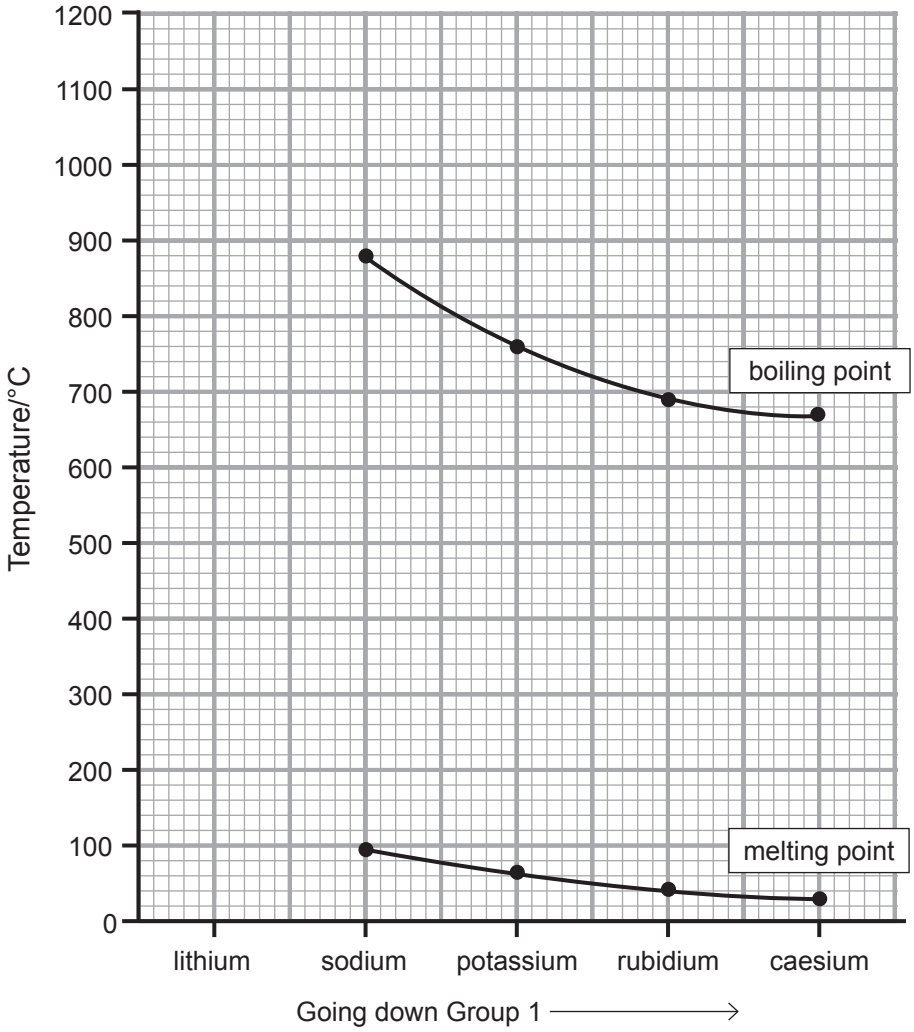
(ii) Complete the diagram below to show how the electrons are arranged in an atom of sodium.



[1]

[Turn over

(e) The graph below shows the melting points and boiling points of some Group 1 metals.



Source: ©CCEA

(i) State the trend shown by the **melting points**.

_____

_____ [1]

(ii) Give **one** difference in the trend of the boiling points compared to the trend of the melting points.

_____

_____ [1]

(iii) Predict the **melting point** of lithium.

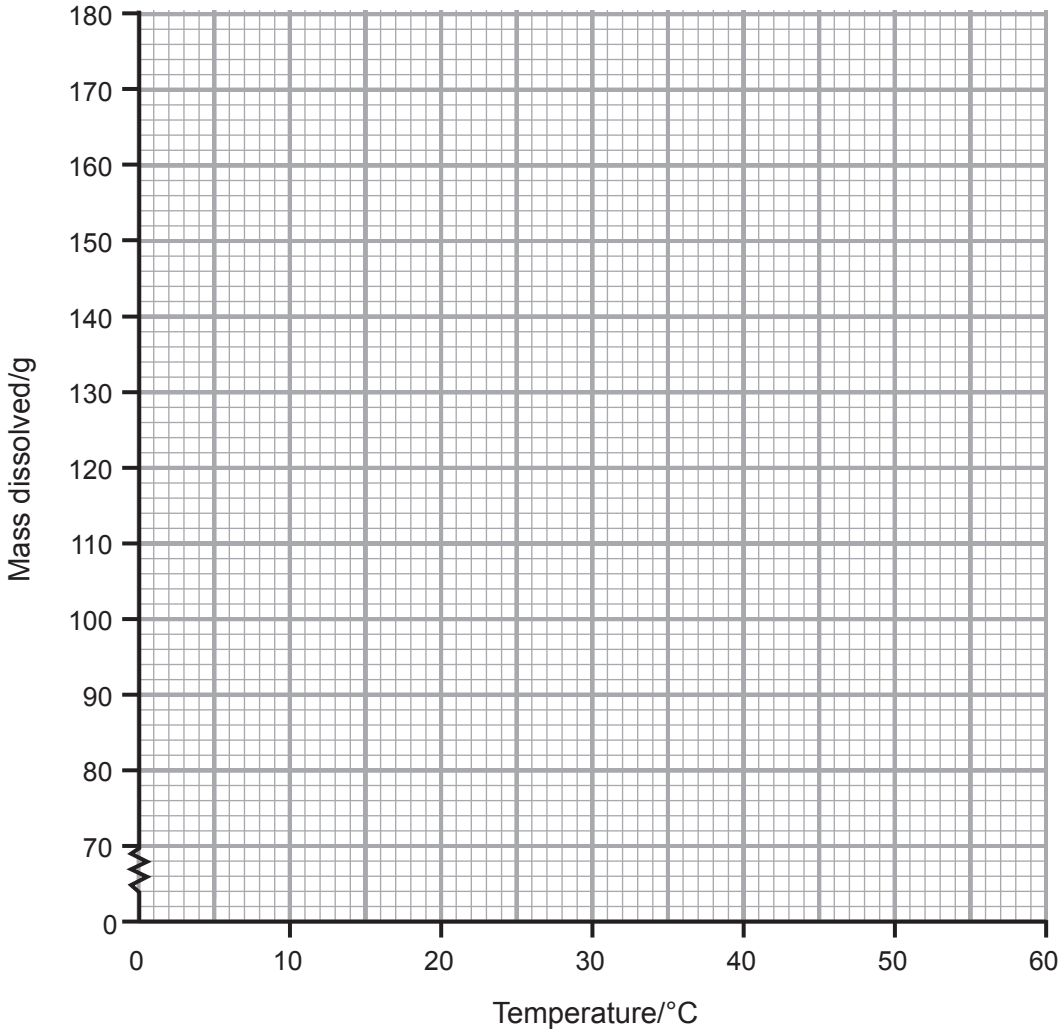
_____ °C [1]

[Turn over

8 A student investigated the maximum mass of a solid that could be dissolved in 100 g of water at different temperatures. The results are shown below.

Temperature/°C	10	20	30	40	50	60
Mass dissolved/g	76.0	123.0	159.0	180.0	180.0	180.0

(a) On the grid below, plot and draw a line graph of these results.



[3]

(b) State fully the trend shown by these results.

_____

_____ [2]

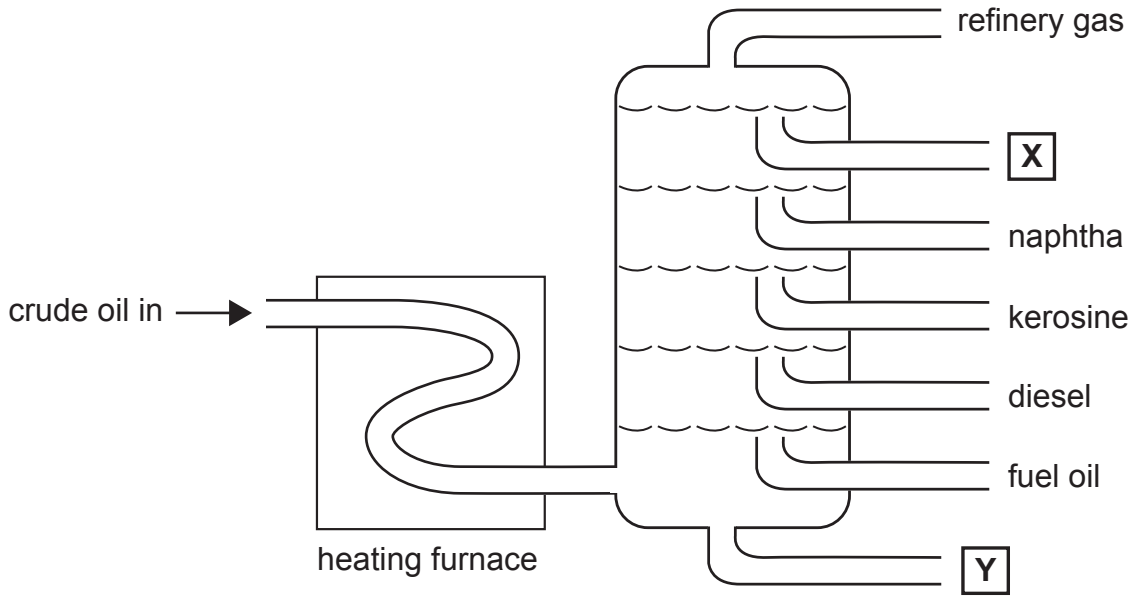
13234

(c) Suggest **one** reason why results could not be obtained for water at temperatures of 0 °C and below.

_____

_____ [1]

9 The diagram below shows how hydrocarbons are extracted from crude oil.



Source: © CCEA

(a) Name the process, shown above, that is used to separate hydrocarbons.

_____ [1]

(b) Complete the following sentence.

Hydrocarbons can be separated using this process because they have different _____. [1]

(c) Name the fractions labelled **X** and **Y** on the diagram.

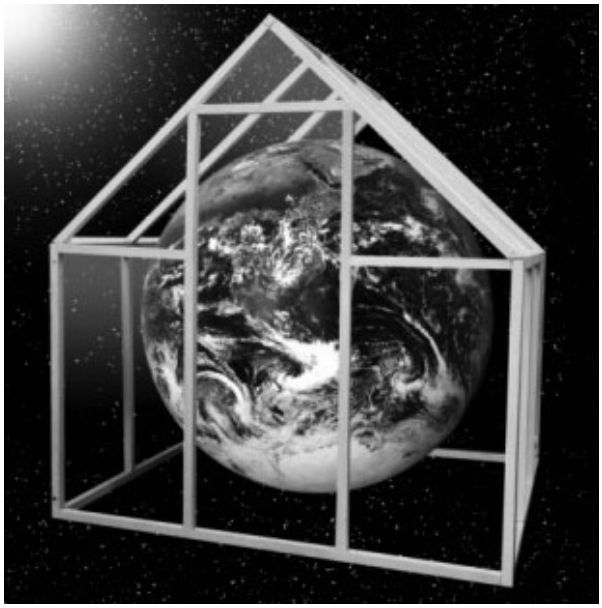
X _____

Y _____ [2]

(d) Refinery gas is mostly made of methane (CH_4). In the box below draw the structure of methane.

[1]

The burning of hydrocarbons is a major source of air pollution and scientists think this is causing an increase in the greenhouse effect.



Source: © Getty Images

(e) Describe how burning hydrocarbons can cause an increase in the greenhouse effect.

Your answer should include:

- the names of the **two** products formed when hydrocarbons burn; and
- **two** consequences of the greenhouse effect.

In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

[6]

THIS IS THE END OF THE QUESTION PAPER

DO NOT WRITE ON THIS PAGE

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

Examiner Number

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.