A

AQA

Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

I declare this is my own work.

Level 3 Certificate/Extended Certificate

APPLIED SCIENCE

Unit 1 Key Concepts in Science
Section B – Chemistry

ASC1/C

Time allowed: 1 hour 30 minutes. You are advised to spend approximately 30 minutes on this section.

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]

For this paper you must have:
- **a calculator**
- **the Formulae Sheet (enclosed)**
- **the Periodic Table (enclosed).**

INSTRUCTIONS

- **Use black ink or black ball-point pen.**
- **Answer ALL questions in each section.**
- **You must answer the questions in the spaces provided. Do not write on blank pages.**
- **If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).**
- **Do all rough work in this book. Cross through any work you do not want to be marked.**

INFORMATION

- **You will be provided with a copy of the Formulae Sheet and the Periodic Table.**
- **There are three sections in this paper:**
  SECTION A – Biology SECTION B – Chemistry
  SECTION C – Physics.
- **The marks for questions are shown in brackets.**
- **The maximum mark for this paper is 60 and the maximum mark for this section is 20.**

ADVICE

Read each question carefully.

DO NOT TURN OVER UNTIL TOLD TO DO SO

SECTION B – CHEMISTRY

Answer ALL the questions in this section.

0 1

The Periodic Table lists the elements in order of increasing atomic number.

0 1 . 1

Define the atomic number of an element. [1 mark]

0 1 . 2

Which is the correct definition for the mass number of an element? [1 mark]

Tick (✓) ONE box.

- ☐ **Average mass of all isotopes of that element**
- ☐ **Number of electrons + number of neutrons**
- ☐ **Number of electrons + number of protons**
- ☐ **Number of protons + number of neutrons**

[Turn over]

0 1 . 3

The Periodic Table is divided into blocks.

Suggest why an element would be classified as an s-block element. [2 marks]

0 1 . 4

Transition elements are in the d-block.

Complete the electron configuration of nickel. [1 mark]

$1s^2 2s^2$ _____

0 1 . 5

Analytical chemists use flame emission spectra to identify metal ions.

Explain how metal ions produce a coloured flame emission spectrum. [3 marks]

[Turn over]

8

0 2

This question is about properties of the elements in Group 2 of the Periodic Table.

TABLE 1 shows data for the elements in Group 2.

TABLE 1

Element	Atomic Number	Atomic radius / $\times 10^{-12}$ m
Beryllium	4	99
Magnesium	12	140
Calcium	20	174
Strontium	38	190
Barium	56	206
Radium	88	211

0 2 . 1

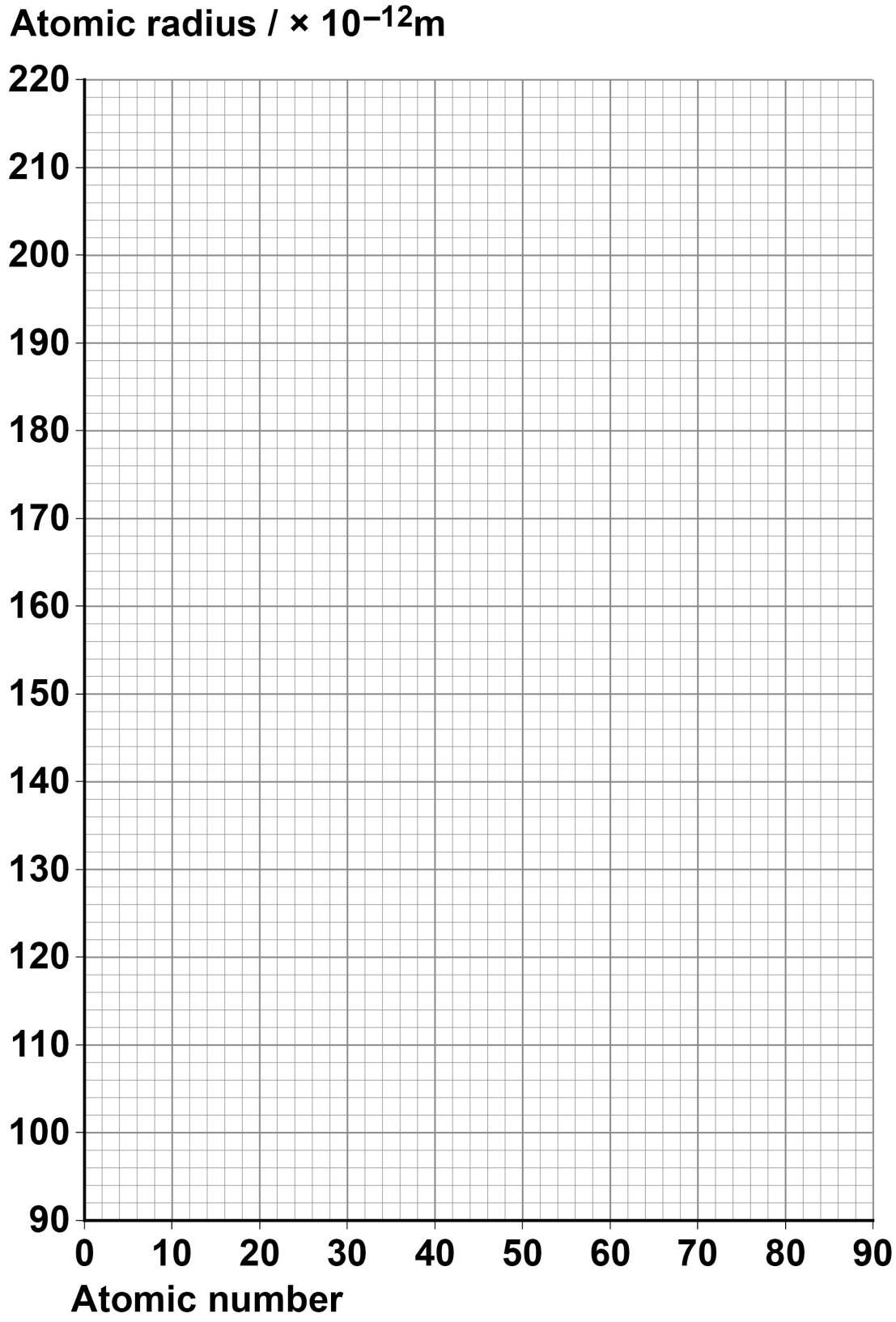
On the opposite page, plot a graph of atomic radius against atomic number on FIGURE 1.

You should:

- **draw a ring around the anomalous value on the graph**
- **draw a line of best fit.**

[3 marks]

FIGURE 1



[Turn over]

0 2 . 2

Explain why atomic radius increases as atomic number increases in Group 2. [2 marks]

0 2 . 3

Magnesium has three stable isotopes.

TABLE 2, on the opposite page, shows information about the three isotopes of magnesium.

TABLE 2

Isotope	Symbol	Isotopic Abundance / %
Magnesium-24	^{24}Mg	79
Magnesium-25	^{25}Mg	10
Magnesium-26	^{26}Mg	11

Calculate the relative atomic mass of magnesium.

Give your answer to 3 significant figures. [3 marks]

Relative atomic mass of magnesium = _____

[Turn over]

8

0 3

Diamond is a form of carbon.

0 3 . 1

Explain why diamond is extremely hard.

Refer to the type of bonding in diamond and the structure of diamond. [3 marks]

0 3 . 2

Why does diamond NOT conduct electricity? [1 mark]

END OF QUESTIONS

4

Additional page, if required.
Write the question numbers in the left-hand margin.

Additional page, if required.
Write the question numbers in the left-hand margin.

BLANK PAGE

For Examiner's Use	
Question	Mark
1	
2	
3	
TOTAL	

Copyright information

For confidentiality purposes, all acknowledgements of third-party copyright material are published in a separate booklet. This booklet is published after each live examination series and is available for free download from www.aqa.org.uk.

Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright-holders may have been unsuccessful and AQA will be happy to rectify any omissions of acknowledgements. If you have any queries please contact the Copyright Team.

Copyright © 2022 AQA and its licensors. All rights reserved.