

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

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

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

Materials

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.
- Fill in the boxes at the top of this page.
- Answer **all** questions in each section.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or 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.

For Examiner's Use	
Question	Mark
1	
2	
3	
TOTAL	

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.



Section B – ChemistryAnswer **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

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]

1s²2s² _____

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]

8

Turn over for the next question

Turn over ►



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

0 2 . 1

Plot a graph of atomic radius against atomic number on **Figure 1**.

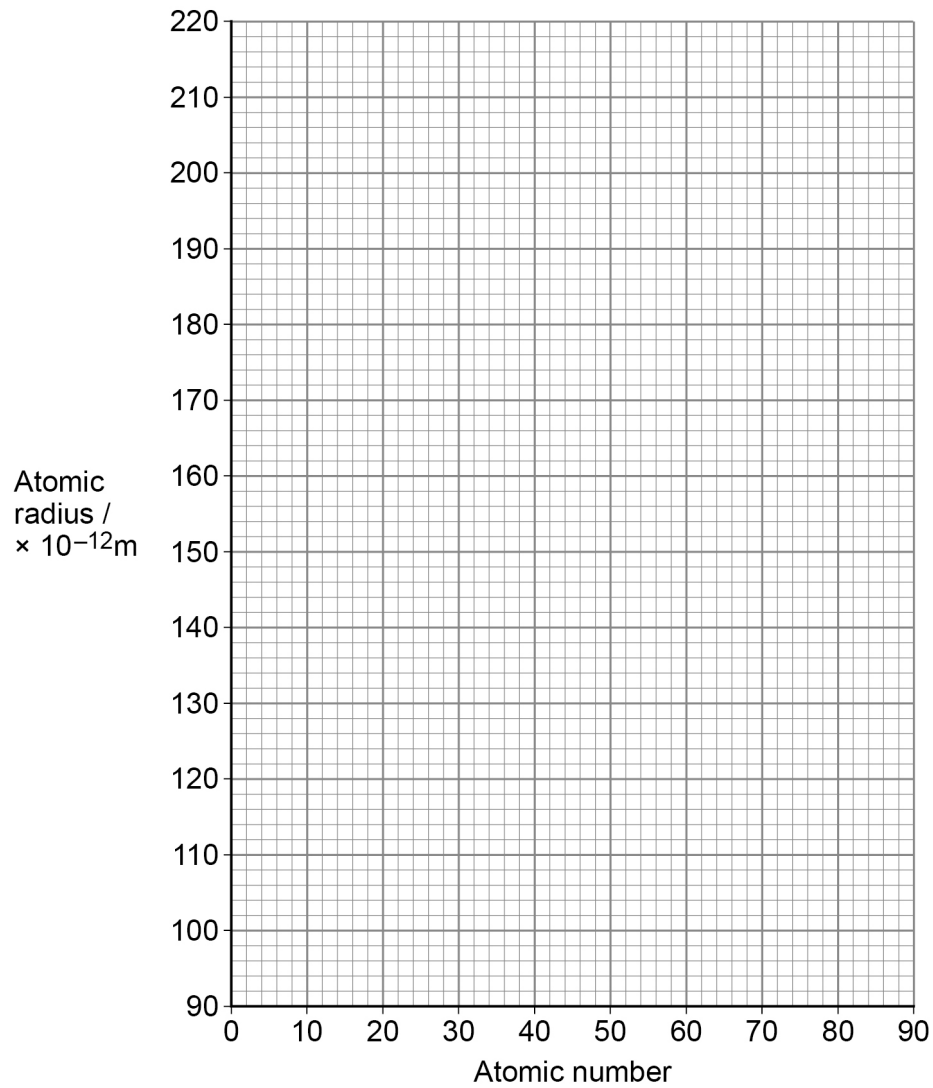
You should:

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

[3 marks]



Figure 1



Question 2 continues on the next page

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 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 = _____

8



0	3
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Diamond is a form of carbon.

0	3	.	1
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Explain why diamond is extremely hard.

Refer to the type of bonding in diamond and the structure of diamond.

[3 marks]

0	3	.	2
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Why does diamond **not** conduct electricity?

[1 mark]

4

END OF QUESTIONS



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1 2



2 2 1 A A S C 1 / C

IB/M/Jan22/ASC1/C