



Please write clearly in block capitals.

Centre number

--	--	--	--	--

Candidate number

--	--	--	--

Surname

Forename(s)

Candidate signature

Level 3 Certificate and Extended Certificate in Applied Science KEY CONCEPTS IN SCIENCE

Unit Number: ASC1

Section B – ASC1/C (Chemistry)

Tuesday 23 January 2018

Morning

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
- Periodic Table
- formulae sheet.

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 outside the box around each page or on blank pages.
- 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 Periodic Table and formulae sheet.
- 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.

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
TOTAL	

Advice

Read each question carefully.



J A N 1 8 A S C 1 C O 1

G/TI/Jan18/E5

ASC1/C

Section B – Chemistry

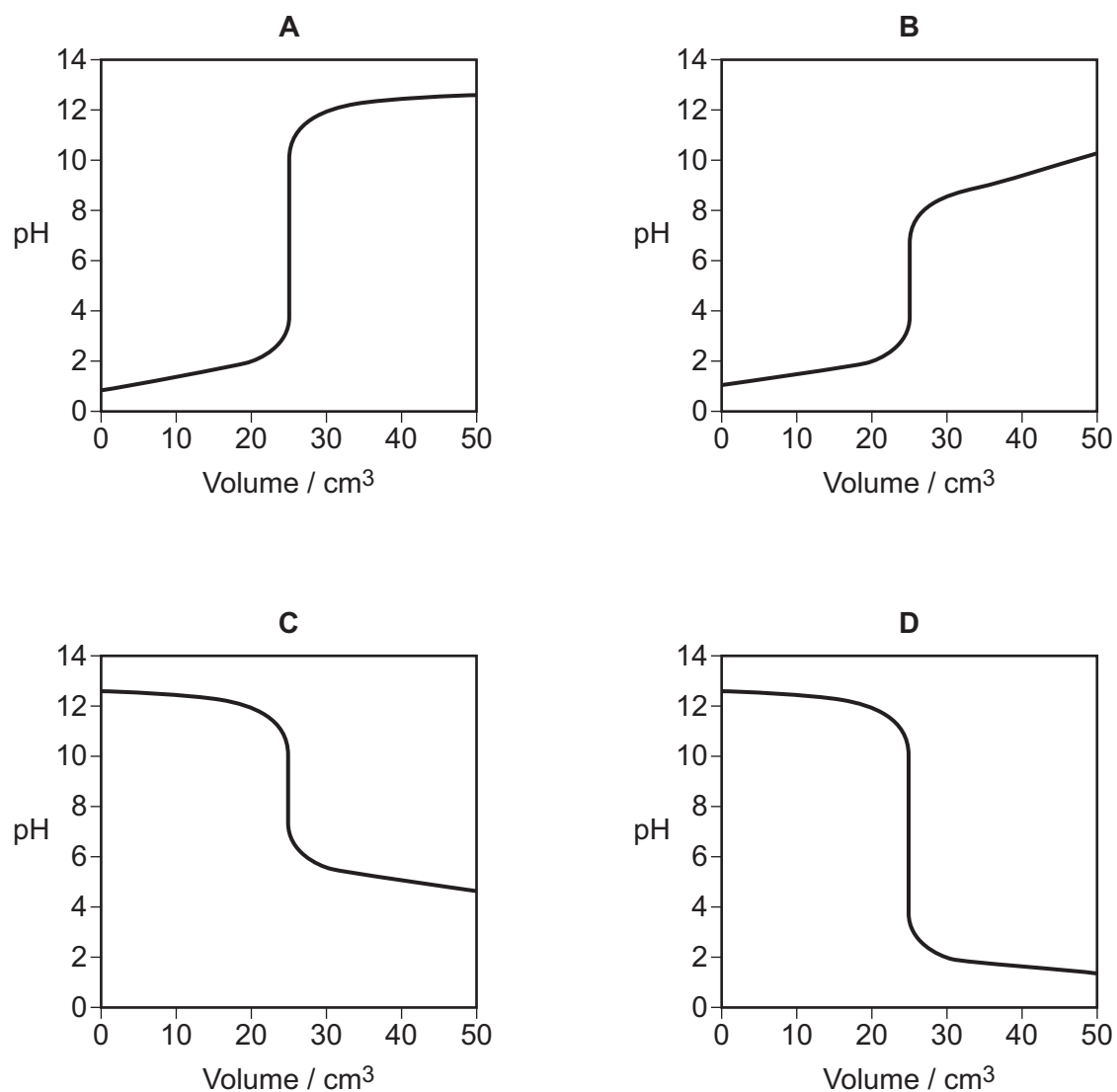
Answer **all** questions in this section.

0 1

Analytical chemists use indicators and pH curves to determine the end point of a titration. **Figure 1** shows titration curves for combinations of different acids and bases.

All solutions have the same concentration.

Figure 1



0 1 . 1

Select from **A**, **B**, **C** and **D** the curve produced by the addition of:**[3 marks]**ethanoic acid (a weak acid) to 25 cm³ of sodium hydroxide _____ammonia solution (a weak base) to 25 cm³ of hydrochloric acid _____hydrochloric acid to 25 cm³ of sodium hydroxide _____

0 1 . 2

Table 1 shows some acid–base indicators and the pH ranges over which they change colour.**Table 1**

Indicator	pH range
Bromophenol blue	3.0–4.6
Phenol red	6.8–8.2
Bromothymol blue	6.0–7.6
Thymolphthalein	9.3–10.5

State which indicator from **Table 1** could be used in the titration that produces curve **D** but not in the titration that produces curve **C**.

Explain your choice.

[2 marks]

Indicator _____

Explanation _____

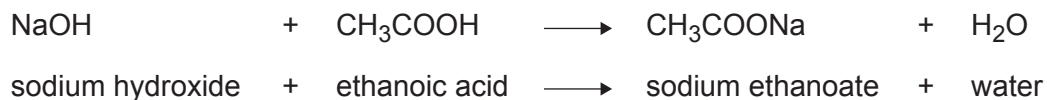
Question 1 continues on the next page**Turn over ►**

0 1 . 3

An analytical chemist at a vinegar manufacturer used titration to monitor the concentration of ethanoic acid in vinegar.

The chemist:

- diluted 50.0 cm³ of the vinegar with distilled water to make a total volume of 500 cm³
- titrated a 25.0 cm³ sample against a standard solution of 0.100 mol dm⁻³ NaOH.



The results are shown in **Table 2**.

Table 2

Volume / cm ³	Titration			
	Rough	1	2	3
At start	0.00	20.20	0.00	14.45
At end	20.20	39.40	14.45	33.55
Used	20.20	19.20	14.45	19.10

Calculate the average volume of sodium hydroxide used in the experiment.

[1 mark]

Average volume = _____ cm³

0 1 . 4

Calculate the number of moles of sodium hydroxide used in the experiment. Use your answer from Question **01.3**.

[1 mark]

Number of moles used = _____



0 1 . 5

State the number of moles of ethanoic acid that reacted with the number of moles of sodium hydroxide in Question 01.4.

[1 mark]

0 1 . 6

Calculate the concentration of the **original** sample of ethanoic acid.

[2 marks]

Concentration = _____ mol dm⁻³

10

Turn over for the next question

Turn over ►



0 2

Research chemists use trends in the properties of some elements to predict the properties of other elements.

Table 3 shows the values of atomic radii for the elements in Group 0 that the research chemist found.

Table 3

Element	Atomic Number	Atomic Radius /m $\times 10^{-12}$
Helium	2	28
Neon	10	58
Argon	18	106
Krypton	36	116
Xenon	54	140
Radon	86	150

0 2 . 1

Plot a graph of atomic radius against atomic number on **Figure 2**.

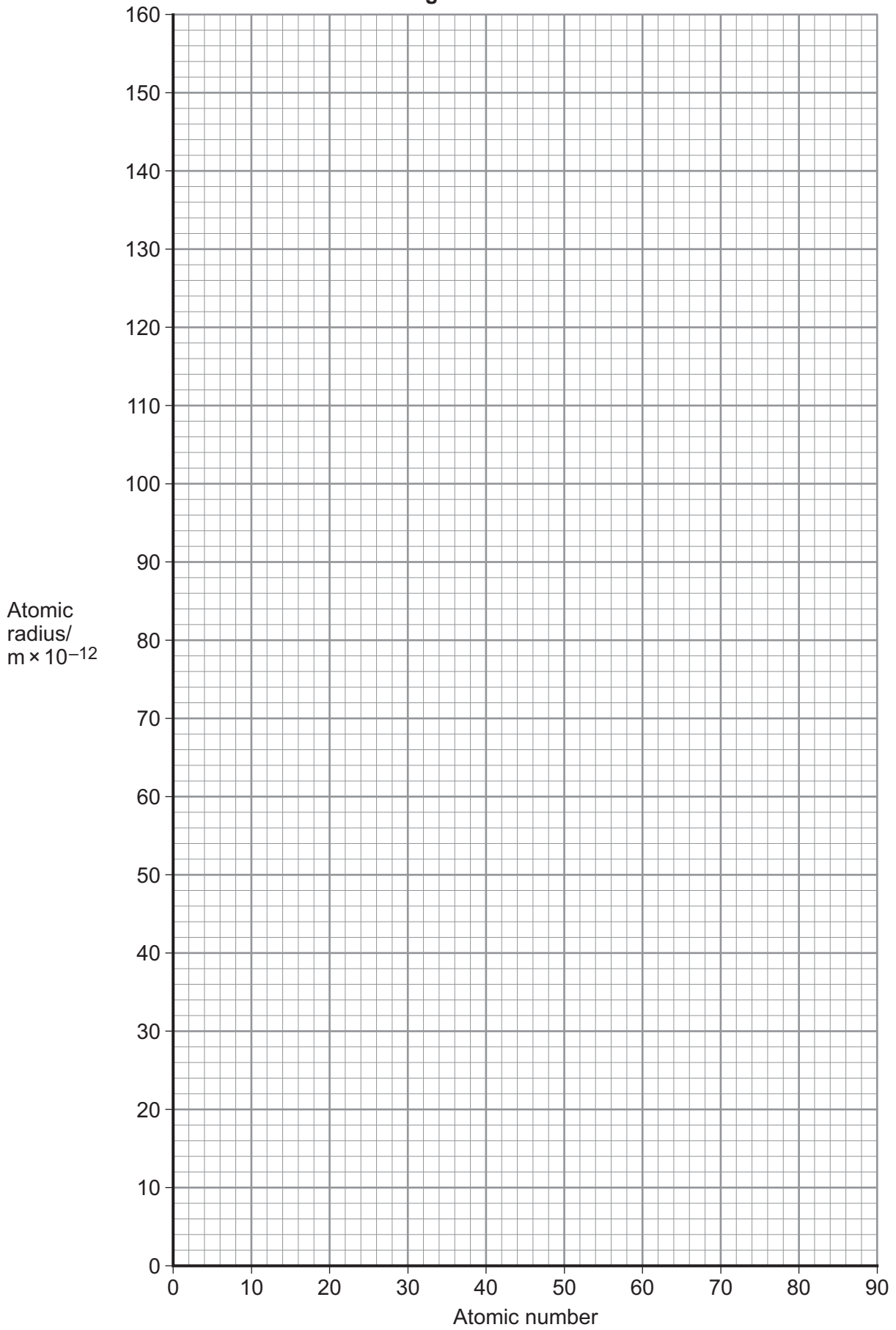
Draw a line of best fit.

[2 marks]



Do not write
outside the
box

Figure 2



Question 2 continues on the next page

Turn over ►



Do not write
outside the
box

0 2 . 2

Identify the anomalous result.

[1 mark]

0 2 . 3

Explain why atomic radius increases as atomic number increases in Group 0.

[2 marks]

5



0	3
---	---

A large proportion of the elements of the Periodic Table are metals.

Aluminium is a metal widely used in the aerospace industry.

0	3	.	1
---	---	---	---

Give the electron configuration of an atom of aluminium, Al.

[1 mark]

0	3	.	2
---	---	---	---

Describe the bonding in aluminium. Include a labelled diagram in your answer.

[4 marks]

END OF QUESTIONS

5



There are no questions printed on this page

*Do not write
outside the
box*

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**



1 0

There are no questions printed on this page

*Do not write
outside the
box*

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**



There are no questions printed on this page

*Do not write
outside the
box*

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**

Copyright information

For confidentiality purposes, from the November 2015 examination series, acknowledgements of third party copyright material will be published in a separate booklet rather than including them on the examination paper or support materials. This booklet is published after each examination series and is available for free download from www.aqa.org.uk after the live examination series.

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, AQA, Stag Hill House, Guildford, GU2 7XJ.

Copyright © 2018 AQA and its licensors. All rights reserved.

