A

AQA

Surname _____

Forename(s) _____

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

Tuesday 17 January 2023 Morning

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 forename(s), your centre number, your candidate number and add your signature.

[Turn over]

JAN23ASC1C01

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.**
- **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

Across the Periodic Table, the properties of the elements change from metallic to non-metallic.

0 1 . 1

What is the name given to the elements in Group 0 (18)? [1 mark]

0 1 . 2

Group 0 (18) elements are very unreactive.

Explain why.

You should refer to electrons in your answer. [2 marks]

0 1 . 3

Explain why the ionisation energies of Group 0 (18) elements decrease as atomic number increases.
[2 marks]

[Turn over]

0 1 . 4

Calculate the number of moles of neon in 0.250 m^3 of the gas at 110 kPa and 800 K.

The gas constant, R = 8.31 $JK^{-1}mol^{-1}$

Use the Formulae Sheet.

Give your answer to 3 significant figures. [4 marks]

Number of moles of neon = _____

9

0 2

When magnesium carbonate ($MgCO_3$) is heated strongly it produces magnesium oxide and carbon dioxide.

0 2 . 1

What is the name given to this type of reaction?
[1 mark]

---

0 2 . 2

Write the balanced symbol equation for this reaction.
[1 mark]

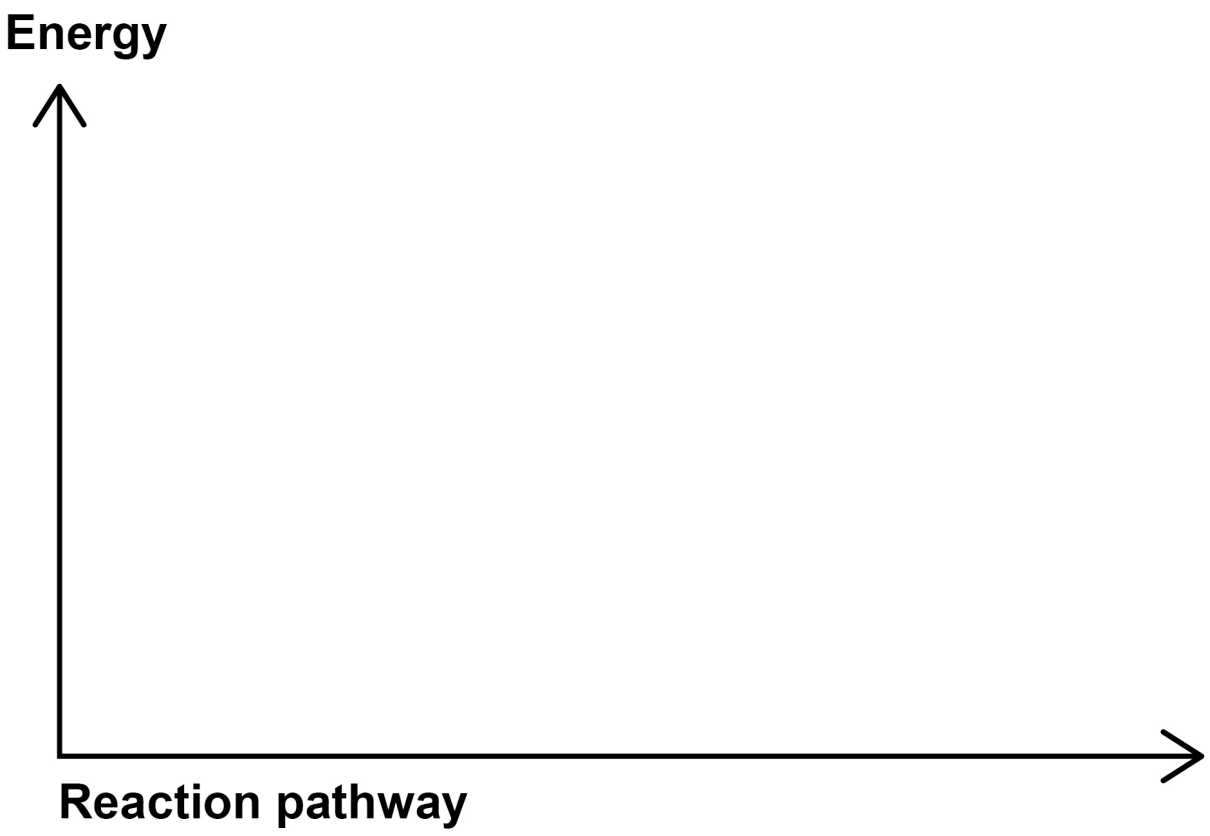
[Turn over]

0 2 . 3

Draw the energy profile on FIGURE 1 for this endothermic reaction.

You should label the reactants and the products on your profile. [3 marks]

FIGURE 1



0 2 . 4

Draw an arrow to show the activation energy on your energy profile in FIGURE 1. [1 mark]

0 2 . 5

Alloys of magnesium are useful because they have a low density.

Draw and label a diagram to show the arrangement of particles in an alloy that contains 90% magnesium and 10% aluminium. [2 marks]

[Turn over]

8

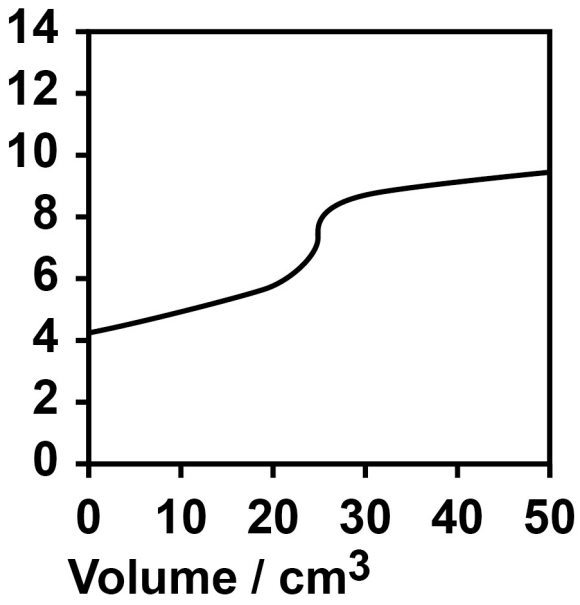
0 3

FIGURE 2, below and on the opposite page, shows titration curves for combinations of different acids and bases.

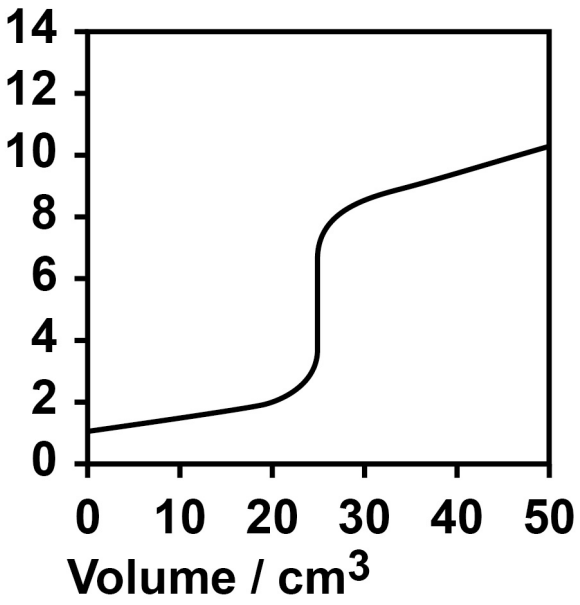
All solutions have the same concentration.

FIGURE 2

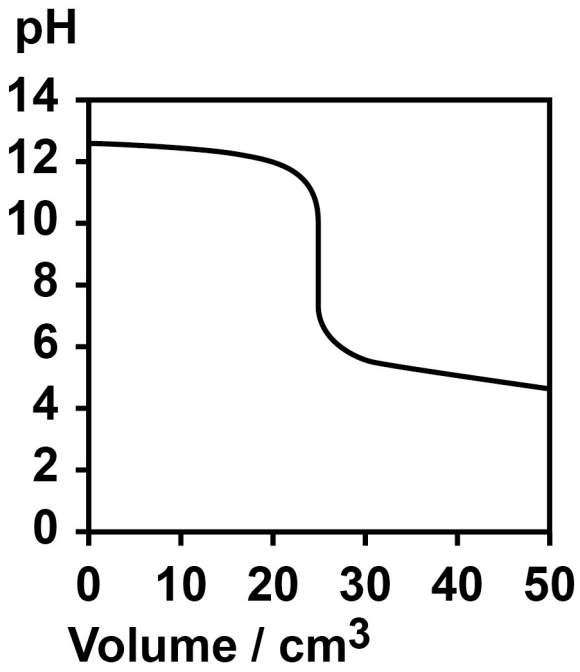
A



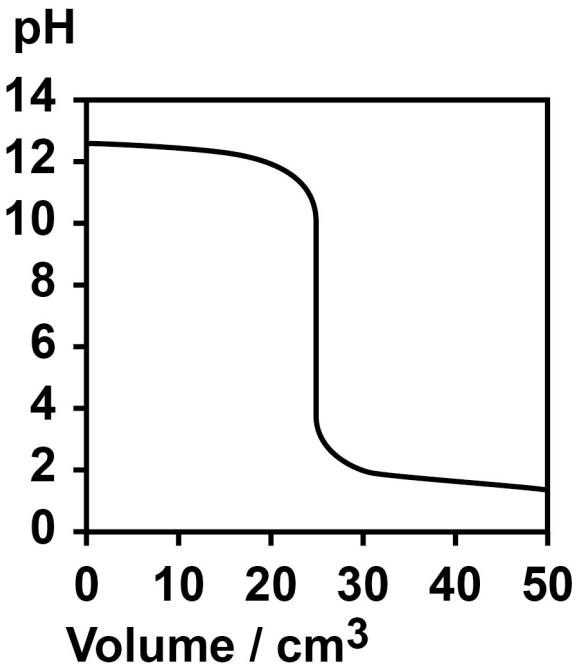
B



C



D



0 3 . 1

Which titration curve shows a weak base being added to a strong acid? [1 mark]

_____

[Turn over]

TABLE 1 shows some acid-base indicators and the pH ranges of their colour change.

TABLE 1

INDICATOR	pH range
Bromophenol blue	3.0–4.6
Methyl orange	3.1–4.4
Bromothymol blue	6.0–7.6
Thymolphthalein	9.3–10.5

0 3 . 2

Suggest which ONE indicator from TABLE 1 could be used in the titration that produces curve C on page 11.

Explain your choice. [2 marks]

Indicator _____

Explanation _____

_____

_____

_____

END OF QUESTIONS

3

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.

Additional page, if required.

Write the question numbers in the left-hand margin.

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For Examiner's Use	
Question	Mark
1	
2	
3	
TOTAL	

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