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Centre number

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Candidate number

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Candidate signature

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# Level 3 Certificate/Extended Certificate

## APPLIED SCIENCE

Unit 1 Key Concepts in Science

Section B – Chemistry

Tuesday 22 January 2019

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.
- 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 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.

For Examiner's Use	
Question	Mark
1	
2	
<b>TOTAL</b>	



**Section B – Chemistry**Answer **all** questions in this section.**0 1**

Material scientists consider the properties of metals when selecting the best metal for a new product such as a metal container.

Metals have a giant structure of regularly arranged neutral atoms.

**0 1 . 1**

Explain why atoms are **always** neutral.

**[2 marks]**

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**0 1 . 2**

Explain why all metals conduct electricity.

**[2 marks]**

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Magnesium is not a suitable metal for making a metal container because it could react with the contents, which may be acidic.

**0 1 . 3**

Write a balanced equation for the reaction between magnesium and hydrochloric acid. Include state symbols.

**[3 marks]**

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0 1 . 4 Some metals are too soft to use to make a metal container unless mixed with other elements to form an alloy. Brass is an alloy containing 95% copper and 5% zinc.

Draw and label a diagram to show the arrangement of particles in brass.

[2 marks]

0 1 . 5 Suggest why brass is harder than pure copper.

[1 mark]

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0 1 . 6 Magnesium and strontium are both metals in **Group 2** of the Periodic Table.

Magnesium has a higher ionisation energy than strontium.

Explain why.

[2 marks]

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12

Turn over ►



**0 2**

The ideal gas equation can be used to determine the number of moles of particles in a gas at a particular temperature and pressure.

**0 2 . 1**

Calculate the number of moles of carbon dioxide in 4.00 m<sup>3</sup> of the gas at 150 kPa and 500 K.

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

**[3 marks]**

Number of moles = \_\_\_\_\_

**0 2 . 2**

When heated, many metal carbonates produce a metal oxide and carbon dioxide.

What is this type of reaction called?

Tick (✓) **one** box.

**[1 mark]**

Combustion

Oxidation

Precipitation

Reduction

Thermal decomposition



**0 2 . 3** A sample of zinc carbonate,  $\text{ZnCO}_3$ , produces 27 moles of carbon dioxide.



Calculate the mass of carbon dioxide gas produced.

Include the unit in your answer.

**[2 marks]**

Mass = \_\_\_\_\_ Unit = \_\_\_\_\_

**0 2 . 4** The sample of zinc carbonate used in Question **02.3** should have produced 40 moles of carbon dioxide.

Suggest **two** reasons why less carbon dioxide was produced than expected.

**[2 marks]**

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

8

**END OF QUESTIONS**



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