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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:

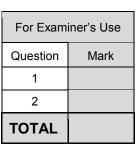
**Section B** – Chemistry Section C - Physics. Section A – Biology

- 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 - Chemistry

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 <b>always</b> neutral.  [2 marks]
0 1.2	Explain why all metals conduct electricity.  [2 marks]
	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]



0 1.4	Some metals are too soft to use to make a metal container unless mixed wit elements to form an alloy. Brass is an alloy containing 95% copper and 5%	
	Draw and label a diagram to show the arrangement of particles in brass.	[2 marks]
1.5	Suggest why brass is harder than pure copper.	[1 mark]
1.6	Magnesium and strontium are both metals in <b>Group 2</b> of the Periodic Table.	
	Magnesium has a higher ionisation energy than strontium.  Explain why.	[2 marks]

Turn over ▶



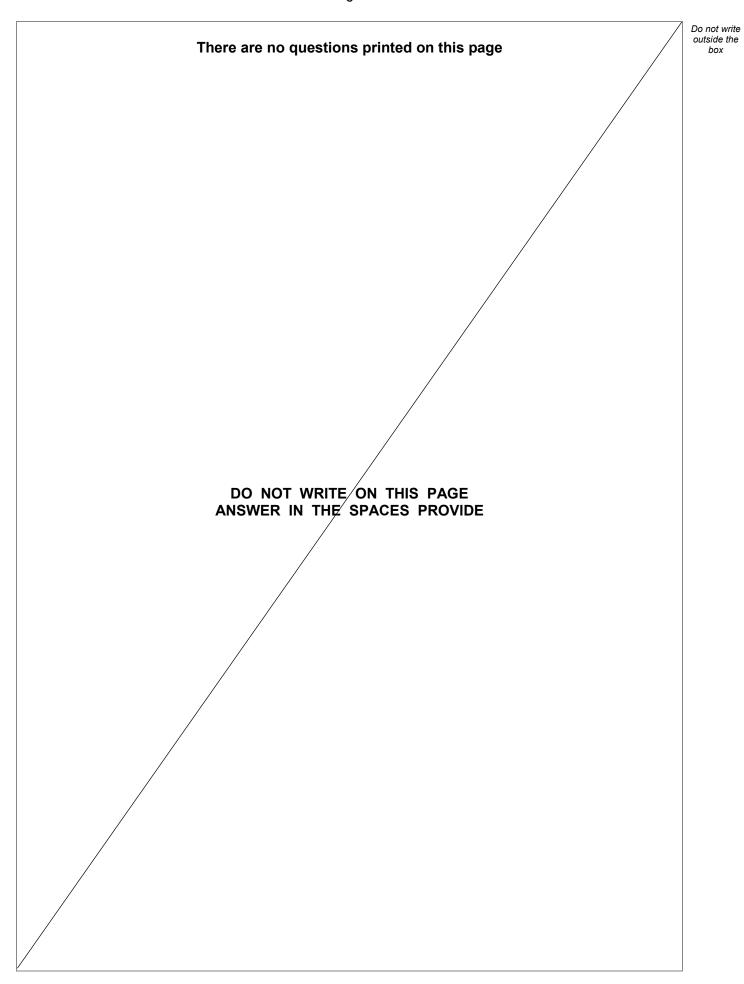
0 2	The ideal gas equation can be used to determine the number of moles of particles in a gas at a particular temperature and pressure.
0 2.1	Calculate the number of moles of carbon dioxide in 4.00 m³ of the gas at 150 kPa and 500 K.
	The gas constant, $R = 8.31 \text{ JK}^{-1} \text{ mol}^{-1}$ [3 marks]
	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, ZnCO <sub>3</sub> , produces 27 moles of carbon dioxide.	outside box
	$ZnCO_3 \rightarrow ZnO + CO_2$	
	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 <b>02.3</b> should have produced 40 moles of carbon dioxide.	
	Suggest <b>two</b> reasons why less carbon dioxide was produced than expected.  [2 marks]	
	1	
	2	8

**END OF QUESTIONS** 







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