



Surname _____

Other Names _____

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

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

[Turn over]



At the top of page 1, write your surname and other names, your centre number, your candidate number and add your signature.

For this paper you must have:

- **a calculator**
- **the Formulae Sheet**
- **the Periodic Table.**



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.**

[Turn over]



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.

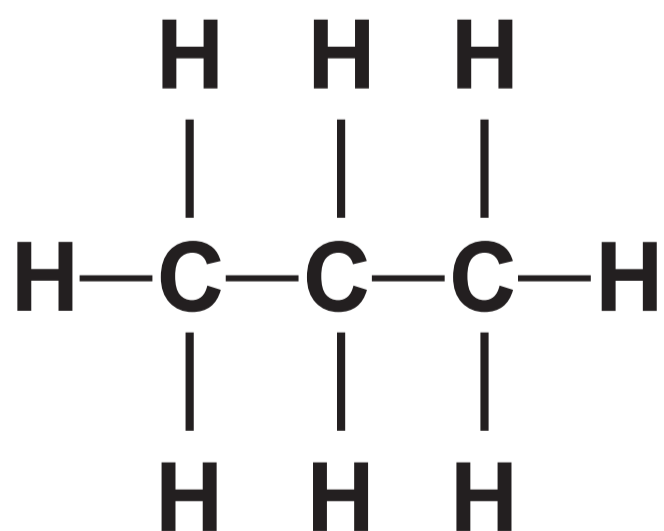
0	1
----------	----------

This question is about propane (C₃H₈).

The carbon and hydrogen atoms in propane are joined by single covalent bonds.

FIGURE 1 shows the displayed formula of propane.

FIGURE 1



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

**Name the type of structure in propane.
[1 mark]**

[Turn over]



0	1	.	2
---	---	---	---

How is a covalent bond formed in propane? [2 marks]



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

Hydrocarbons with small molecules, such as propane, are volatile.

Define the term VOLATILE. [1 mark]

[Turn over]



The enthalpy of formation of propane can be calculated using Hess's Law and enthalpies of combustion.

0 1 . 4

Define the term ENTHALPY OF FORMATION. [2 marks]



01.5

TABLE 1 shows enthalpy of combustion data.

TABLE 1

	C(s)	H ₂ (g)	C ₃ H ₈ (g)
Enthalpy of combustion / kJ mol ⁻¹	-393.5	-285.8	-2220.7

Calculate the enthalpy of formation of propane.

Use the enthalpy changes of combustion shown in TABLE 1 and Hess's Law to answer.

[Turn over]



Draw a Hess's Law cycle in your answer.



[4 marks]



Enthalpy of formation

of propane = _____ kJ mol⁻¹

[Turn over]



0	2
---	---

This question is about calcium and calcium compounds.

0	2	.	1
---	---	---	---

Give the electron configuration of a calcium atom.

Use the Periodic Table. [1 mark]



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

**Describe the metallic bonding
in calcium. [2 marks]**

[Turn over]



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

Calcium metal reacts with dilute nitric acid to form calcium nitrate and one other product.

Identify the other product. [1 mark]

0	2	.	4
---	---	---	---

The formula of the nitrate ion is NO_3^-

**What is the formula of calcium nitrate?
[1 mark]**



0	2	.	5
---	---	---	---

Metal ions in solution are often identified by adding sodium hydroxide solution.

The ionic equation for the reaction of calcium ions with hydroxide ions is:



What type of reaction is this? [1 mark]

Tick (✓) ONE box.

Acid-base neutralisation

Acid-metal

Combustion

Precipitation

[Turn over]



0	2	.	6
---	---	---	---

Calcium hydroxide can react with carbon dioxide to form calcium carbonate.

The equation for the reaction is:



Calculate the number of moles of calcium carbonate formed from 200 kg of calcium hydroxide.

Use the Periodic Table. [4 marks]

Number of moles of calcium carbonate = _____

10

END OF QUESTIONS



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.



Additional page, if required. Write the question numbers in the left-hand margin.

BLANK PAGE

For Examiner's Use	
Question	Mark
1	
2	
TOTAL	

Copyright information

For confidentiality purposes, all acknowledgements of third-party copyright material are published in a separate booklet. This booklet is published after each live examination series and is available for free download from www.aqa.org.uk.

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.

Copyright © 2022 AQA and its licensors. All rights reserved.

GB/VW/Jun22/ASC1/C/E2

