

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname _____

Forename(s) _____

Candidate signature _____

Level 3 Certificate / Extended Certificate APPLIED SCIENCE

Unit 1 Key Concepts in Science
Section B – Chemistry

Monday 11 June 2018

Afternoon

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 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.

Advice

Read each question carefully.

For Examiner's Use	
Question	Mark
1	
2	
3	
TOTAL	



There are no questions printed on this page

*Do not write
outside the
box*

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ANSWER IN THE SPACES PROVIDED**



Section B – ChemistryAnswer **all** questions in this section.

0 1 The Periodic Table is a valuable tool that has been developed by chemists over many years.

0 1 . 1 Complete the sentence. **[1 mark]**

The Periodic Table lists elements in order of _____

0 1 . 2 The elements in group VII (17) all have similar chemical properties.
What is the name given to the elements in group VII (17)? **[1 mark]**

0 1 . 3 State the trend shown in electronegativity in group VII (17) elements. **[1 mark]**

0 1 . 4 Explain why elements in the same group of the Periodic Table have similar chemical properties. **[2 marks]**

5

Turn over ►

0 2

Silicon has three stable isotopes.

0 2 . 1

State what is meant by the term isotope.

[2 marks]

0 2 . 2**Table 1** shows information about isotopes of silicon.**Table 1**

Isotope	Symbol	Isotopic abundance / %
Silicon-28	^{28}Si	92
Silicon-29	^{29}Si	5
Silicon-30	^{30}Si	3

Calculate the relative atomic mass of silicon.

Give your answer to 3 significant figures.

[3 marks]

Relative atomic mass = _____



0 2 . 3 Silicon has a structure similar to diamond.

Explain why silicon has a high melting point.

[3 marks]

8

Turn over for the next question

Turn over ►



0 3

Chemical engineers often use Hess's Law to calculate enthalpy changes.

0 3 . 1

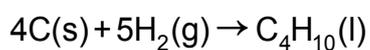
Table 2 shows the enthalpy change of combustion of carbon, hydrogen and butane.

Table 2

	Carbon C(s)	Hydrogen H ₂ (g)	Butane C ₄ H ₁₀ (g)
Enthalpy change of combustion (kJmol ⁻¹)	-393.5	-285.8	-2877.5

Use information from **Table 2** to determine the accurate value of the enthalpy change of formation of butane.

Give your answer to 1 decimal place.

[4 marks]

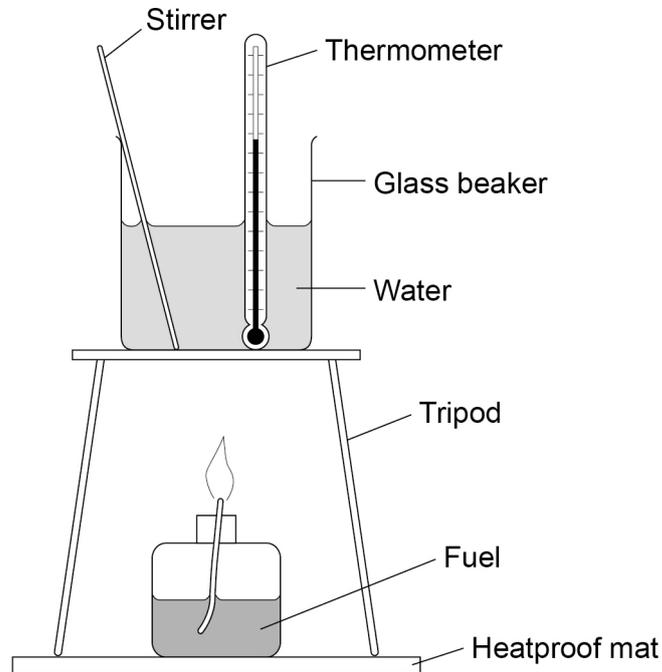
Enthalpy change of formation = _____ kJ



A student wants to determine the enthalpy change of combustion of a fuel.

Figure 1 shows the equipment the student used.

Figure 1



0 3 . 2 It is difficult to determine accurate enthalpy of combustion, as heat loss is a major error.

Give **two** ways that the design of the experiment in **Figure 1** could be improved to reduce the amount of heat loss.

[2 marks]

1 _____

2 _____

0 3 . 3 Give **one** other possible source of error that would affect the enthalpy change value.

[1 mark]

END OF QUESTIONS



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