

**A LEVEL**

**Examiners' report**

# **CHEMISTRY B**

**H433**

For first teaching in 2015

**H433/03 Autumn 2020 series**

## Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates.



Reports for the Autumn 2020 series will provide a broad commentary about candidate performance, with the aim for them to be useful future teaching tools. As an exception for this series they will not contain any questions from the question paper nor examples of candidate answers.

The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

A full copy of the question paper and the mark scheme can be downloaded from OCR.

### Would you prefer a Word version?

Did you know that you can save this PDF as a Word file using Acrobat Professional?

Simply click on **File > Export to** and select **Microsoft Word**

(If you have opened this PDF in your browser you will need to save it first. Simply right click anywhere on the page and select **Save as . . .** to save the PDF. Then open the PDF in Acrobat Professional.)

If you do not have access to Acrobat Professional there are a number of **free** applications available that will also convert PDF to Word (search for PDF to Word converter).

## Paper 3 series overview

The H433/03 component assesses content from across all teaching modules of A Level Chemistry B but places particular emphasis on practical skills.

Candidates are required to use knowledge and understanding of principles and concepts in the planning of experimental and investigative work and in the analysis and evaluation of data.

Chemical literacy is assessed through extended response questions as well as the comprehension of, and use of, data from a Practical Insert

Question styles include short answer (structured questions, problem solving, calculations, practical) and extended response questions.

<i>Candidates who did well on this paper generally did the following:</i>	<i>Candidates who did less well on this paper generally did the following:</i>
<ul style="list-style-type: none"><li>• Wrote clearly and logically taking points in the question in sequence, (either using full sentences or bullet points).</li><li>• Laid out calculations carefully, explaining what each step represented e.g. moles of a reactant or mass of a product.</li></ul>	<ul style="list-style-type: none"><li>• Did not take the care needed with laying out calculations.</li><li>• Did not use diagrams where they would clearly have helped</li><li>• Did not read the question stem (including the Insert) carefully enough and produced responses which were not addressing the questions asked.</li></ul>

### Themes in candidate responses

Many candidates showed they knew, in broad terms, some of the underlying chemistry needed to answer the questions set, but a common theme was the lack of detail or specificity in their responses.

## Comments on responses by question type

### Level of response questions

The responses to this question type highlighted some of the issues raised above. Those responses which scored higher marks tended to be logical and structured.

A significant number of candidates did not read the stem of the question, or the material/data provided in the Practical Insert, carefully enough, and went off track with their responses.

1(b) was a good example of this: many candidates produced a procedure suitable for assessing the ease of thermal decomposition of a Group 2 carbonate. This was not the investigation asked for in the stem of the question and although examiners gave some credit for a suitable method for collecting the carbon dioxide, candidates could not access the higher mark levels. Those candidates who did address the acid carbonate reaction asked for in the stem, in the main, produced good responses.

In common with similar practical procedures featured other components in this series 4(a) found candidates less secure on the multiple steps needed to carry out this complex procedure. Examiners were expecting to see:

- a method to sample the reaction mixture at appropriate time intervals
- an appropriate method to quench the reaction
- a titration method, including the choice and colour change of an appropriate indicator
- a suitable calculation, using the titre results to calculate the concentration of hydroxide ion at the different time intervals

### Mathematical questions

	<b>AfL</b>	<p>Many candidates set out their calculations with clear steps.</p> <p>This is important because it allows examiners to award credit for error carried forward calculation.</p>
--	------------	---

	<b>AfL</b>	<p>In agreement with other components, it is certainly worthwhile for candidates to highlight or underline in the question stem where there is a requirement for a certain number of significant figures. e.g. 2(c) as a reminder for when they arrive at an answer.</p>
--	------------	--

In question 1(c)(ii) there were several different routes possible to answer the question. These included a stepwise mole calculation and an algebraic version; the latter proving more difficult. Nevertheless a pleasing number of candidates were successful in their response.

3(a) also produced many correctly calculated values, however, as with most enthalpy calculations, examiners required a sign, in this case negative, to gain the final mark.

4(b)(i) and (ii): The plotting of the graph and its use in calculating half-lives was pleasingly well done.


## Other


1(d) The description of the  $\Delta_v H$  from the energy level diagram was often recognised as the enthalpy of hydration, but very few described it as for both cation and anion together.

In 1(e) the factors involved in determining the magnitude of enthalpy changes of solution (the formation of ions, charge density, etc.) challenged some candidates. Several candidates realised that barium is indeed more reactive than calcium but did not establish that this was not relative to the hydration of the group 2 metal cations.

4(b)(iii)(iv) This part of the rate of reaction question was found to be difficult; the problem in many cases came from the candidates not distinguishing between the primary and tertiary haloalkanes and the information given in Method 1 and Method 2 in the Insert. Many seemed to blur the two compounds into one substance and as a result found the questions difficult.

## Common misconceptions

	<b>Misconception</b>	A number of candidates have the misconception that the only pre-requisite for hydrogen bonding to occur between molecules is simply that hydrogen atoms feature in the structure.
---	----------------------	---

	<b>Misconception</b>	<p>Bond making and breaking processes.</p> <p>A whole raft of misconceptions were seen in responses to this topic, including:</p> <ul style="list-style-type: none"> <li>• that more bonds are made than broken in an exothermic reaction involving molecular reactants and products, and that is why energy is given out</li> <li>• bond making and breaking both require energy</li> <li>• there are more, rather than stronger, intermolecular bonds formed between well-packed molecular structures compared to 'looser' packed molecules.</li> </ul>
---	----------------------	---

## Guidance on using this paper as a mock

A key analysis, looking at candidate responses, might be to go through student answers after use as a mock, and tick off whether their answer has addressed accurately all the chemical points made in the stem of the question.

---

# Supporting you

---

## Review of results

If any of your students' results are not as expected, you may wish to consider one of our review of results services. For full information about the options available visit the [OCR website](#). If university places are at stake you may wish to consider priority service 2 reviews of marking which have an earlier deadline to ensure your reviews are processed in time for university applications.

## Supporting you through 2020-2021

Our priority is supporting you and your students this autumn and to support you as you prepare for summer 2021 exams. We'll update our [website information](#) regularly with resources, guidance and key information.

## Take a look at our support for:

- [Teachers](#)
- [Students](#)
- [Exams officers](#)
- [Assessment specialists](#)

## Keep up-to-date

We are sending a weekly roundup to tell you about important updates. You can also sign up for your subject specific updates. If you haven't already, [sign up here](#).

## OCR Professional Development

Attend one of our popular CPD courses to hear directly from a senior assessor or drop in to a Q&A session. All our courses for the academic year 2020-2021 are being delivered live via an online platform, so you can attend from any location.

Please find details for all our courses on the relevant subject page on our [website](#) or visit [OCR professional development](#).

## Signed up for Exambuilder?

**ExamBuilder** is the question builder platform for a range of our GCSE, A Level, Cambridge Nationals, Cambridge Technicals and Functional Skills qualifications. See the full list of available qualifications in the [sign up form](#).

ExamBuilder is **free for all OCR centres** with an Interchange account and gives you unlimited users per centre. We need an [Interchange](#) username to validate the identity of your centre's first user account for ExamBuilder.

If you do not have an Interchange account please contact your centre administrator (usually the Exams Officer) to request a username, or nominate an existing Interchange user in your department.

## Need to get in touch?

If you ever have any questions about OCR qualifications or services (including administration, logistics and teaching) please feel free to get in touch with our Customer Support Centre.

General qualifications

**01223 553998**

**general.qualifications@ocr.org.uk**

Vocational qualifications

**02476 851509**

**vocational.qualifications@ocr.org.uk**

For more information visit

 [ocr.org.uk/i-want-to/find-resources/](https://ocr.org.uk/i-want-to/find-resources/)

 [ocr.org.uk](https://ocr.org.uk)

 [/ocrexams](https://www.facebook.com/ocrexams)

 [/ocrexams](https://twitter.com/ocrexams)

 [/company/ocr](https://www.linkedin.com/company/ocr)

 [/ocrexams](https://www.youtube.com/ocrexams)

## We really value your feedback

Click to send us an autogenerated email about this resource. Add comments if you want to. Let us know how we can improve this resource or what else you need. Your email address will not be used or shared for any marketing purposes.



I like this



I dislike this



OCR is part of Cambridge Assessment, a department of the University of Cambridge.

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored. © OCR 2020 Oxford Cambridge and RSA Examinations is a Company Limited by Guarantee. Registered in England. Registered office The Triangle Building, Shaftesbury Road, Cambridge, CB2 8EA. Registered company number 3484466. OCR is an exempt charity.

OCR operates academic and vocational qualifications regulated by Ofqual, Qualifications Wales and CCEA as listed in their qualifications registers including A Levels, GCSEs, Cambridge Technicals and Cambridge Nationals.

OCR provides resources to help you deliver our qualifications. These resources do not represent any particular teaching method we expect you to use. We update our resources regularly and aim to make sure content is accurate but please check the OCR website so that you have the most up to date version. OCR cannot be held responsible for any errors or omissions in these resources.

Though we make every effort to check our resources, there may be contradictions between published support and the specification, so it is important that you always use information in the latest specification. We indicate any specification changes within the document itself, change the version number and provide a summary of the changes. If you do notice a discrepancy between the specification and a resource, please [contact us](#).

You can copy and distribute this resource freely if you keep the OCR logo and this small print intact and you acknowledge OCR as the originator of the resource.

OCR acknowledges the use of the following content: N/A

Whether you already offer OCR qualifications, are new to OCR or are thinking about switching, you can request more information using our [Expression of Interest form](#).

Please [get in touch](#) if you want to discuss the accessibility of resources we offer to support you in delivering our qualifications.