Qualification Accredited

Oxford Cambridge and RSA

A LEVEL

Examiners' report

CHEMISTRY B

H433

For first teaching in 2015

H433/01 Autumn 2020 series

Version 1

Introduction

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

i	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 1 series overview

H433/01 is one of three papers in the GCE A Level Chemistry B Salter's chemistry A Level suite. This component covers knowledge and understanding across the whole specification with the questions being set in a chemical context. To do well on this paper candidates needed to apply their knowledge in familiar or unfamiliar contexts. This paper contains 30 multiple choice questions as well as the standard mix of questions relating to practical techniques, mathematical skills and longer answer extended response questions.

Candidates who did well on this paper generally did the following:	***Candidates who did less well on this paper generally did the following:***
• Could synthesise a complex explanation, e.g. Q31(e), 34(b)(ii). • Could clearly explain a practical technique, e.g. Q34(e). • Could manipulate numerical data, especially solubility products, Q35. • Could handle multi-step calculations, e.g. Q 31(c)(iv).	• Had trouble with calculations, e.g. Q31(f), Q35. • Did not always follow instructions on significant figures and standard form, e.g. 32(b), 32(c)(iv). • Could answer the question on poly(chloroethene), 33(a), but were less able to give the equation for the formation of polyester, Q33(c)(iii). • Could understand why a dye absorbs visible light, Q 34(c), but included incorrect or imprecisely expressed ideas such as emission or 'opposite on the colour wheel', rather than 'complementary colour'.

Section overview: Section A

This section includes 30 multiple choice questions over a wide range of topics to cover areas not included in detail in Section B. The performance of candidates has continued to improve in this section. Their working on the paper showed them eliminating incorrect options and working out calculations to look for the correct answer. There were very few omissions suggesting timing was not a problem.

	AfL	Questions that proved difficult were • Colours of d-block ions, Q8 • Fusion reactions, Q10 • Intermolecular forces and boiling point, Q11 • pH, q17 • Protein chains, Q18 • Esterification involving ethanoic anhydride, Q22

Section overview: Section B

This section contained 5 structured questions. There was evidence of some careful revision; even among the lower-scoring responses the factual details were correct, and candidates are to be congratulated on their preparation under difficult circumstances. There were some very high-scoring papers where knowledge was applied successfully to complex situations. All candidates scored well on oxidation states, and in finding the value of K_c. For the latter, even if the equilibrium concentrations were not correct, they were able to score marks for the method and units. Entropy changes, catalysis and 33(d), the structures of phenol and propanone were also done well.

Themes in candidate responses

Level of response questions

Candidates' skills in answering these have continued to improve and they are able to structure their answers in a logical way and address all parts of the question. They also managed to answer succinctly and there were very few instances of extra space being needed.

33(d) was very well answered indeed; many candidates were in Level 3 and had the correct structures for both substances and addressed all the evidence suppled in the question to justify their answer. There was considerable evidence of working on page 24, next to the information; this was not always fully incorporated into the answer, but examiners looked at this page and gave it credit where appropriate anyway.

34(e) proved less high-scoring as familiarity with the practical technique and its application to the problem of dye washing out of wool samples was less secure. This will be considered under practical applications.

Practical applications

Candidates had revised practical observations well, such as colours of precipitates and solutions, iron(III) chloride and Fehling's tests. There were some difficulties with reagents and conditions, such as the formation of the diazonium salt in Q34(a) and the need for concentrated sulfuric acid in sulfonation.

Students found the use of complex practical procedures difficult in this paper, as they have in the past. Colorimetry is a technique that may only have been used a few times during the course and it was clear that there was some confusion over its use in testing the colour fastness of dyes at different temperatures.

Ideally, we would have liked to see:

- the calibration of the colorimeter using several dye solutions of known concentration.
- plotting a calibration curve
- Testing of the fabric samples and measuring the concentration of dye washed out at different temperatures.

The section on controlled variables was good, but there was some confusion between calibration and zeroing the colorimeter with a cuvette of distilled water. The calibration curve was sometimes confused with a graph of concentration against temperature. Some even suggested finding the gradient of this.

Mathematical questions

	AfL	The maths questions were generally well set out with clear steps so that marks for the method or error carried forward could be achieved even if the final answer was not correct. This is very important as, if the examiner can follow the steps, most of the marks can be gained even if the final answer is incorrect.

	AfL	It might help students to use a highlighter in exams as the requirement for a certain number of significant figures or standard form was sometimes overlooked after the calculation had been completed. It is also helpful to highlight concentrations or numbers that will be needed in a calculation as it saves time re-reading the question to find them.

Questions involving moles and empirical formula were well done.

In 31(d) many answers used the entropy and enthalpy to correctly give the minimum temperature for the reaction and most scored 2 out of 3 for the entropy change.

Similarly, many were able to score 3 out of 4 for 31(f) even if they had not calculated the equilibrium concentrations correctly.

pH and solubility product continue to prove difficult. Q 35 was targeted at higher grades and relatively few candidates scored well. In 35(b) the lack of confidence meant that working was less clear, and some did not make the connection between the concentration of silver ions and chloride ions or follow the calculation to the concentration of the undiluted seawater.

In 35(c)(i) some candidates did not explicitly state that $[Ag^+] = [Cl]$ was a reason for $[Ag^+]$ being $\sqrt{K_{sp}}$.

35(c)(ii)There were two routes to the answer in this question. Finding the concentration of chromate ions proved difficult as students did not consider the dilution of 1 cm^3 potassium chromate in the total volume.

The other route was working out what the concentration of chromate ions needed to be to form a precipitate and showing the actual concentration was much less than this. This was difficult for students.

Common misconceptions

31(e) proved difficult, as students did not appreciate that the yield and rate of formation of ammonia was the key thing to remove NO, with less removed at low engine temperature due to the endothermic reaction. Instead they focused on the carbon dioxide.

Difficulties were also encountered in explaining why chlorine oxidised bromide ions to bromine in 32(c)(iii). Answers focused merely on the reactivity of chlorine and displacement without mentioning electrons. The electronegativity of chlorine was also cited, which is not relevant here.

34 (c) included answers where the dye emits the complementary colour. It seems that the colour of dyes is less well understood than it was.

	AfL	Intermolecular interactions between species proved difficult to explain. In 32(d)(i) the incorrect intermolecular forces between HCl were frequently given and in 34(b)(ii) the answers explaining the solubility of dyes C and D were vague. We wanted a clear explanation that the OH group on C enabled it to form 1 H-bond with water, but that the weak instantaneous dipole-induced dipole forces in the rest of the molecule would make dissolving unlikely. In Dye D there were more opportunities to form H-bonds and the sulfonate group enabled stronger ion-dipole forces to be formed, increasing its solubility

Guidance on using this paper as a mock

Hopefully using this paper will help candidates develop their confidence in tackling questions and show the need to revise the practical procedures encountered during the course as there is a quota for marks on practical assessment in each of the papers. Going through the answers afterwards might help to clarify some of the difficulties encountered, such as solubility product and the interactions between species, whether through intermolecular bonds between molecules or the attachment of dyes to fibres.

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/**
- **ocr.org.uk**
- **/ocrexams**
- **/ocrexams**
- **/company/ocr**
- **/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**

Cambridge Assessment