



Examiners' Report Principal Examiner Feedback

Summer 2023

Pearson Edexcel GCE
In Chemistry (8CH0)
Paper 02 Core Organic and Physical Chemistry

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Publications Code 2206_8CH0_02_ER

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Introduction

Some aspects of this paper were very challenging, particularly Q7civ and 8b. These questions were placed near the end of the paper, and it was clear candidates were struggling to answer the remaining questions.

In other questions, candidates showed a significant misunderstanding of the question, eg.in Q3b the skeletal formula of cyclohexane was offered instead of cyclohexene (which was required). It was unclear if candidates genuinely misread this question, or did not know how to answer it at all.

Marks were generally low for Q7civ.

Similarly, for Q8b, those who did not achieve marks in 8bi, were also likely to get Q8bii incorrect. Although some who were incorrect in Q8bi, rectified the problem in their answer to Q8bii.

Some then went on to be more successful in 8bii. There was a challenge in the calculation of Q8bii, where units were deliberately mismatched (kJ g^{-1} and kJ mol^{-1}). As expected, the stronger candidates identified this problem and made an appropriate correction in their calculation. The relevant Hess Law statement was often missing, leaving the examiner to relate the figures to the student's version of the Hess cycle.

Q3c asked about the bonding electron clouds in ethene. This proved to be a tough question, presumably because it is asked infrequently.

Q3gi was a question about a mechanism. This was surprisingly well answered. Nearly all students scored well with just a few minor errors. Candidates had clearly been well-prepared for this type of questions.

Q1

Many curves finished too high and/or were not asymptotic.

Q2

Generally, this question answered well. However, some candidates did display a misunderstanding or struggle with the calculation sections.

The most common error in Q02c was omission of the $\times 12$ (MP2) for 12CO_2 .

Q3a

This question was answered fairly well, and candidates generally performed as expected.

Q3b

It was surprising to see a number of candidates provide cyclohexane answers.

Q3c

Candidates found this quite difficult, which may be due to this type of question not being as frequent as others.

Q3di

Candidates generally performed well on this question.

Q3dii

This question was quite challenging, with very few candidates answering correctly and scoring marks.

Q3f

This question was not answered well. Many candidates put the side group and/or the $\text{C}=\text{C}$ in the backbone.

Q3gi

This question was answered extremely well, with only a very small number of candidates not understanding the question and therefore not scoring any marks. It was clear candidates had been well prepared for this.

Q3h

Many answers referred to scrubbing but the answers were generally unconvincing. It was clear some candidates did not understand the meaning of the key terms.

Q4ai

Many candidates missed MP1, which was about dissolving the halogenoalkane.

It was clear from the responses that many candidates had heard the term

'fair test' but were unsure of the meaning.

Q4aii

Very few candidates seemed to be aware of the role of water in releasing the halide ion. Many answers reacted the silver (ions) with halogenoalkane.

Q4b

This question was generally answered well, with very few being unsure of how to answer it at all.

Q4ci

Many correct responses were seen, however, some candidates incorrectly selected distractor 'A'.

Q4cii

Many candidates missed, or were unaware of, 'inorganic' and gave an amine as their answer.

Q4di

Candidate answers referring to handling losses were not very common.

MP1 was most popular with, sometimes, several of the mark scheme reasons discussed.

Q4dii and Q4diii

The reagents were quite widely known. The conditions were more of a Challenge for candidates.

Q5ai

Generally, candidates don't seem to favour calculation questions, although this one was reasonably successful for many students.

Q5aii

Students did not entirely understand the idea of a negative number, and should be encouraged to discuss the magnitude of the number separately from its sign. Many scored M2 using the AG answer.

Q5b

Many random answers were seen on this question, with candidates being unable to differentiate between theoretical and practical reasons.

Heat loss to the surroundings and incomplete combustion were frequently seen.

Q5c

A small number of candidates did not do well on this question and had clearly never encountered mass spec. Of those who scored just 1 mark, it was sometimes the m/z value that was missing.

Q6

Some candidates seemed reluctant to opt for the simplest expression (which was the correct selection).

Q7b

This was a straightforward question and many candidates scored both marks. A small number of candidates were unable to score marks, and mixed up exothermic and endothermic.

Q7cii

Just 'distil' achieved the mark although some far more complex answers were seen, most of which went 'off target'.

Q7ciii

The lack of warm/heat for MP1 and ppt for MP2 were very common, but were rewarded with a rescue mark. Tollens reagent and (sometimes) a correct result were quite common.

Q7civ

In retrospect this question asked for too much and the marks were generally low. The 'reflux' mark (IP1) was usually scored and often IP3 as well.

The general level of diagram drawing was not as expected and was quite weak. It was sometimes difficult to recognise common pieces of lab equipment.

Q8

Q8a was generally answered well, with just a few candidates giving answers that were too generalised to score.

Candidates who did not score marks in Q8bi usually were unable to score marks on Q8bii as well.

Many candidates were unsuccessful in achieving marks, and struggled with the mismatched units in the calculation.

The mark scheme was slightly amended to allow those candidates who completely misunderstood the question to score marks. However, the more students frequently recognised the problem.

Summary

- There is a tendency for pupils to leave decimal numbers as a fraction (presumably because that's what the calculator does). While a fraction has more accuracy than a decimal, examiners will often look for a decimal number.
- Diagrams will be expected at some stage. Candidates are encouraged to ensure they are neat and accurate, eg typical problems: condensers that do not allow water to enter the reaction mixture, or condensers where the water flow appears to be blocked. Thermometers are often placed in the wrong position.
- Calculations should appear in a logical order. Be wary of scattering numbers across a page (it often means that the student has little idea of how to proceed and there is a danger that any valid calculation may be obscured by the rest). A few written words to demonstrate a line of reasoning to the examiner will always be welcome, and in some instances may be essential.
- Candidates should minimise the words used in a descriptive response, provided the meaning is still clear and the logic is apparent. For example, in this paper the mark for Q7cii could be gained with the single word 'distil'. Do not repeat yourself or even worse, contradict yourself.

