Examiners' Report
June 2015

GCE Chemistry 6CH02 01

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Introduction

This paper was a reasonable balance of standard and higher demand questions, the latter often requiring candidates to write well-structured, logical explanations. Many candidates proved well-prepared to answer some of the standard questions resulting in some excellent descriptions of the flame test and explanations of the associated theory, and of the group trend in thermal stability. The accuracy of writing organic mechanisms was, overall, impressive. Candidates were far less assured when required to apply their knowledge in unfamiliar situations and often showed an uncertain grasp of basic experimental practice. A significant number of candidates penalised themselves by a clear failure to read the questions with sufficient care, affecting their scores in several questions, notably 18(a)(iii), 18(b)(iv), 18(c) and 19(a)(i).

The multiple choice was the highest scoring section of the paper, with a mean score of 71%, and almost all the questions proved accessible to at least half the entry. The question that most candidates got right was 10(a) (correctly answered by 97.5% of candidates), followed by, in order of increasing difficulty, questions 1, 10(b), and 8. The higher demand multiple choice question was 11 (correctly answered by 43.0% of candidates), followed by, in order of decreasing demand, questions 7, 6 and 4.

Candidates found sections B and C to be of similar difficulty overall.

Question 18 (ai)

There were many explanations in terms of halogenoalkanes dissolving in ethanol but this was often explained in terms of the polarity of the halogenoalkane molecule rather than London forces, while candidates often suggested that ethanol reacted with the halogenoalkanes. The importance of ethanol as a solvent suitable for use with the halogenoalkanes and silver nitrate was appreciated by few candidates.

(i) Why is ethanol used as a solvent in this experiment?

(1)

This is because ethanol is polar so the halogenoalkanes can dissolve in it.

ResultsPlus
Examiner Comments

The statements were all correct but the connection between the polar nature of ethanol and its ability to dissolve halogenoalkanes was incorrect and the main point of the question was missed.

ResultsPlus
Examiner Tip

This is an experiment based question and the features of all the reactants need to be considered.

(i) Why is ethanol used as a solvent in this experiment?

(1)

To allow the silver nitrate and the halogenoalkane to mix

ResultsPlus
Examiner Comments

This response included the key link between the halogenoalkanes and the silver nitrate so was sufficient to score the mark.

(i) Why is ethanol used as a solvent in this experiment?

(1)

The halogenoalkanes dissolve more readily in ethanol than water. Because ethanol has both polar and non-polar characteristics.

ResultsPlus
Examiner Comments

The first part of the answer was not sufficient to score the mark but the second point did gain credit even though the candidate had not really demonstrated a full understanding of the relevance of the ethanol characteristics mentioned.

Question 18 (aii)

The simple idea of temperature equilibration eluded most candidates and alternative explanations, often involving discussion of activation energy, were preferred. A surprising number suggested that the delay was to ensure that the substitution reaction was complete before the addition of the silver nitrate. This indicated a fundamental misunderstanding of this standard experiment.

(ii) Explain why the apparatus was left for 5 minutes before the silver nitrate was added.

(1)

To allow the halogenoalkanes and ethanol to react completely before adding another compound.

ResultsPlus
Examiner Comments

This type of answer was surprisingly common despite the reaction under discussion being clearly described in the stem of the question.

ResultsPlus
Examiner Tip

Read the question carefully!

(ii) Explain why the apparatus was left for 5 minutes before the silver nitrate was added.

(1)

To ensure they had all heated up sufficiently.

ResultsPlus
Examiner Comments

This response was insufficiently precise to gain credit. The use of 'they' is vague, and candidates at this level should have some appreciation that heat and temperature are distinct concepts.

ResultsPlus
Examiner Tip

Ensure that your answer fully communicates your ideas.

Question 18 (aiii)

While the precipitate required was well-known, its formula or description were often given rather than the name, although that requirement was in bold in the question. Candidates who knew that silver bromide was formed were usually able to write the ionic equation.

(iii) **Name** the precipitate formed in the test tube containing 1-bromobutane and write an **ionic** equation for the formation of this precipitate. State symbols are not required.

(2)

Precipitate Cream precipitate

Ionic equation

$Ag^+ + Br^- \longrightarrow AgBr$

ResultsPlus
Examiner Comments

Another common response.

Question 18 (aiv)

The reaction sequence was known by most candidates and usually accompanied by the correct explanation. Candidates who thought that 1-chlorobutane reacted fastest explained this in terms of the polarity of the C–X bond.

(iv) Predict the order (fastest first) in which the halogenoalkanes form precipitates. Explain your answer.

(2)

Order: 1-chlorobutane then 1-bromobutane then 1-iodobutane.

Explanation: Chlorine is the most reactive out of the 3 so it would undergo a substitution reaction the quickest.

ResultsPlus
Examiner Comments

The sequence is wrong because the candidate has confused the reactivity of the halogenoalkane with that of the halogen.

ResultsPlus
Examiner Tip

There is a fundamental chemical idea here: the more reactive an element, the more stable its compounds are likely to be.

Question 18 (bi)

This question was almost always answered correctly.

Question 18 (bii)

While there were many good answers to this question, a surprising number of candidates proved unable to work out what was going on in the chemical systems under discussion. A common problem was the failure to appreciate that water was the nucleophile in the original reaction despite the clue offered by 18(b)(i). This led to explanations in terms of the need to split the water molecule in the absence of the alkali or references to the effect of hydrogen bonding. Even when the basic chemistry was understood, a lack of precision often meant that the mark could not be awarded. There were many references to alkali rather than the hydroxide ion and candidates often identified the number of lone pairs on the oxygen of the hydroxide ion as the key factor.

(ii) Explain why the formation of alcohols is faster with aqueous alkali than with water.

(1)

Aqueous alkali is a stronger nucleophile

ResultsPlus
Examiner Comments

This candidate understood the parameters of the question but failed to correctly identify the nucleophile in the alkali.

(ii) Explain why the formation of alcohols is faster with aqueous alkali than with water.

(1)

In aqueous ~~alk~~ alkali, OH^- ions are present, which are stronger nucleophiles than the water molecules

ResultsPlus
Examiner Comments

An example of an extremely well-structured response.

Question 18 (biii)

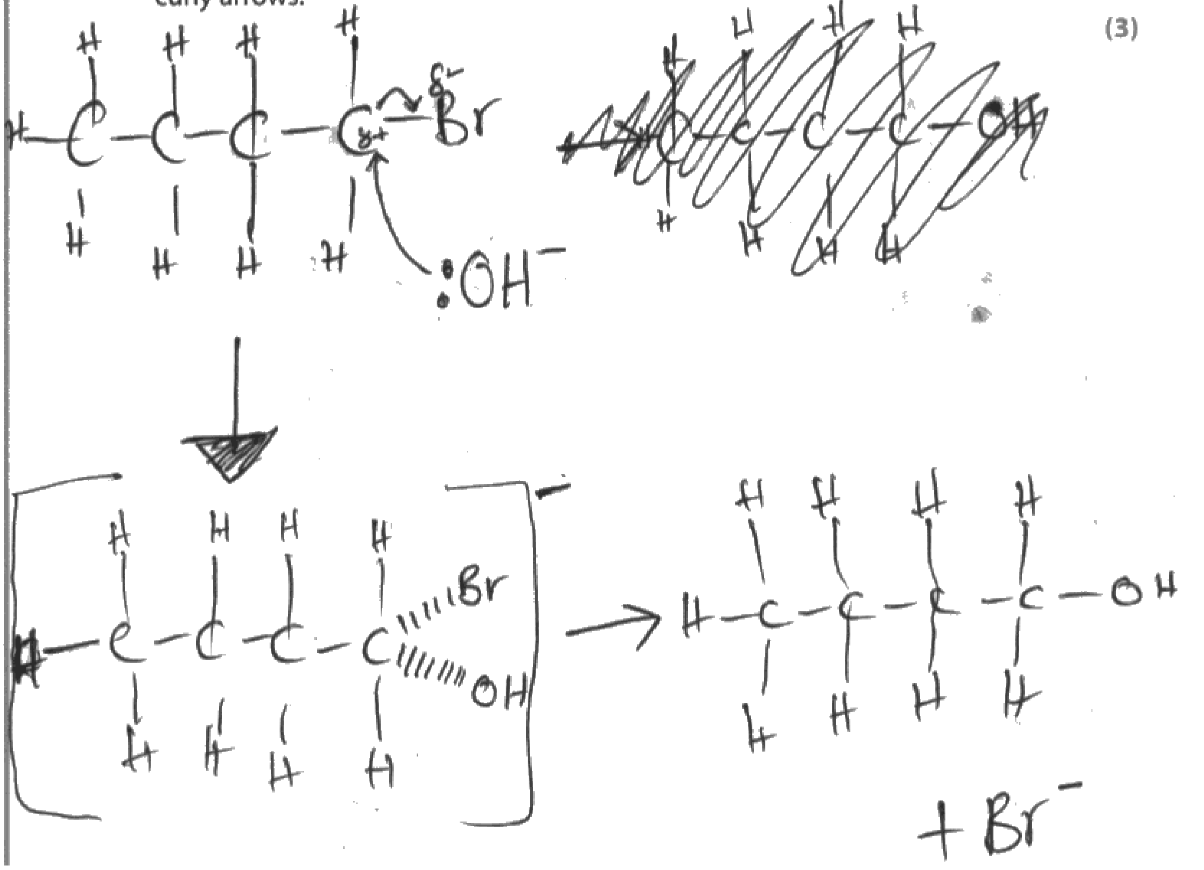
Common errors in drawing this mechanism were poor placement of the curly arrows, omission of the C−Br dipole, omitting the charge on the hydroxide ion or misplacing its lone pair, onto the hydrogen or covering both atoms.

Answers showed S_N1, S_N2 and the concerted single-stage mechanism, all of which were acceptable.

(iii) Give the mechanism for the reaction of 1-bromobutane with aqueous alkali.

Show the lone pair involved in the mechanism and any relevant dipoles and curly arrows.

(3)



ResultsPlus
Examiner Comments

The top curly arrow should show the movement of the electron pair of the C-Br bond to the bromine atom.

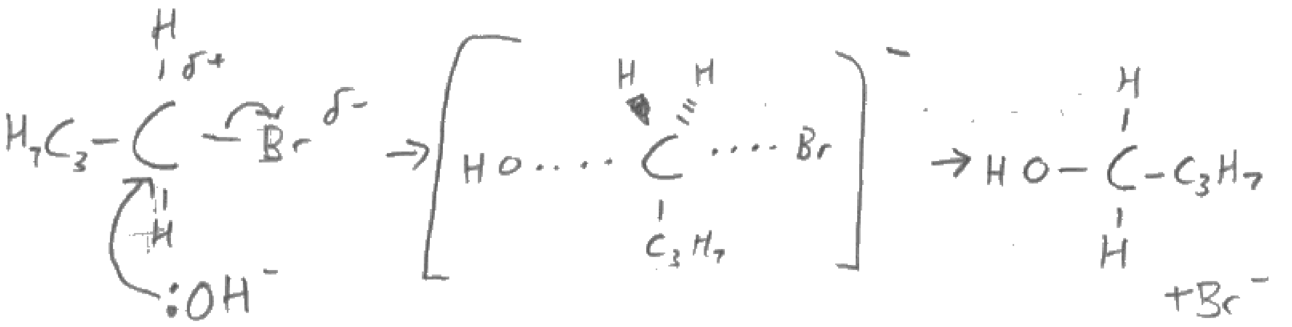
ResultsPlus
Examiner Tip

Understanding that curly arrows represent the movement of specific pairs of electrons is essential for drawing accurate mechanisms. Curly half arrows represent the movement of single electrons.

(iii) Give the mechanism for the reaction of 1-bromobutane with aqueous alkali.

Show the lone pair involved in the mechanism and any relevant dipoles and curly arrows.

(3)



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Examiner Comments

A fully correct answer which showed an S_N2 mechanism.

Question 18 (biv)

While the observations for the two suggested tests were well known, very few candidates related the issue of suitability to the experiment described and the significance of the reaction mixture being aqueous.

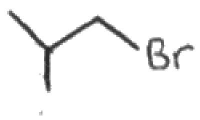
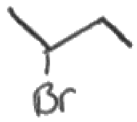
Question 18 (c)

There were some displayed or semi-displayed structures and many candidates named the isomers, rather than classifying them. Common errors included duplicating isomers, especially the secondary, and including bromopropane isomers; there were also quite a few cyclic compounds drawn. Some candidates seemed uncertain how to represent the bromine atom in a skeletal structure and made the C−Br bond considerably shorter than the C−C bonds or omitted it altogether.

(c) 1-bromobutane is classified as a **primary** halogenoalkane and is one of the four structural isomers with a molecular formula C_4H_9Br.

Give the **skeletal** formula of the three isomers, other than 1-bromobutane, classifying the halogenoalkane in each case.

(3)

Skeletal formula	Classification
	1 bromo propane
	2 bromo butane
	2 bromo propane

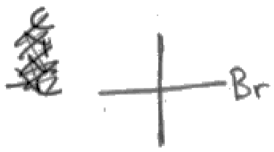
ResultsPlus
Examiner Comments

A surprisingly common response which showed the correct skeletal structures but named the compounds rather than classifying them.

(c) 1-bromobutane is classified as a **primary** halogenoalkane and is one of the four structural isomers with a molecular formula C_4H_9Br.

Give the **skeletal** formula of the three isomers, other than 1-bromobutane, classifying the halogenoalkane in each case.

(3)

Skeletal formula	Classification
	tertiary halogenoalkane
	secondary halogenoalkane
	secondary halogenoalkane

ResultsPlus

Examiner Comments

The inclusion of a cyclic compound as an isomer occurred quite frequently.

Question 19 (a)

Many candidates were unable to describe the standard test for a carbonate. Despite the requirement 'at room temperature', strong heating was a popular suggestion. Even those who were aware that an acid was required often suggested sulfuric acid. It was not always clear that the product gas was mixed with lime water and less successful responses described mixing the carbonate with lime water. Only the more successful responses gave a balanced equation for the reaction of carbon dioxide with lime water and many gave an equation involving carbon dioxide and calcium oxide. The equation for the reaction of barium carbonate with an acid also caused difficulties, often with the formula of the barium salt and the balancing.

19 Two white powders, **A** and **B**, known to be Group 2 carbonates, are investigated.

(a) (i) The presence of the carbonate ion is usually confirmed using a simple test carried out in two stages at room temperature. Describe this test and its results.

(2)

Test: You add an acid (eg HCl) to the carbonate, ~~reaction~~ and test the gas produced by bubbling it through limewater.

Results: The limewater will go cloudy, due to carbon dioxide, ~~and~~ so there is a carbonate present.

(ii) Using barium carbonate as your example, write the equation for each of the stages of the carbonate test. Include state symbols in both equations.

(3)

First equation (test)

$$BaCO_{3(s)} + 2HCl_{(aq)} \rightarrow BaCl_{2(aq)} + H_2O_{(l)} + CO_{2(g)}$$

Second equation (result)

$$CO_{2(g)} + Ca(OH)_{2(aq)} \rightarrow CaCO_{3(s)} + H_2O_{(l)}$$

ResultsPlus
Examiner Comments
A rare fully correct answer which gave all essential details, including the bubbling of the gas through the lime water.

19 Two white powders, **A** and **B**, known to be Group 2 carbonates, are investigated.

(a) (i) The presence of the carbonate ion is usually confirmed using a simple test carried out in two stages at room temperature. Describe this test and its results.

(2)

Test: Add hydrochloric acid

Results: CO_2 would be produced which turns limewater cloudy.

(ii) Using barium carbonate as your example, write the equation for each of the stages of the carbonate test. Include state symbols in both equations.

(3)

First equation (test)

$$BaCO_{3(s)} + HCl_{(aq)} \rightarrow BaCl_{(aq)} + CO_{2(g)} + H_2O_{(l)}$$

Second equation (result)

$$CO_{2(g)} + CaCO_{3(aq)} \rightarrow CaO_{(s)} + CO_{2(aq)}$$

($CaCO_{3(aq)}$ ↓ limewater)

ResultsPlus
Examiner Comments

The test and results section was sufficient to score full marks. The attempts at writing balanced equations showed some typical failings in this core skill. The first equation had an incorrect formula for barium chloride and the candidate ignored the consequential imbalance in the equation. Very few candidates seemed familiar with the chemistry of testing carbon dioxide with limewater.

Question 19 (bi)

There were many excellent descriptions of the flame test. Candidates were most likely to lose marks by failing to identify a suitable material for the test wire or the correct acid. Candidates risked the final mark by placing the sample over, under or by the flame rather than in it, and by using a luminous flame. A few candidates referred to the sample being burned; while this inaccuracy would not normally be penalised it should certainly be avoided.

Question 19 (bii)

Even when candidates knew that the elements were calcium and magnesium, ionic charges were frequently incorrect or omitted altogether and the identities of **A** and **B** were sometimes transposed. The names of the ions and formulae of the compounds were also given.

Question 19 (biii-iv)

Candidates were well prepared for this question, giving concise well-structured explanations of the source of the flame colours. Less successful responses were vague about the movement of electrons or failed to mention electrons altogether.

For the most part, answers that failed to score on 19(b)(iv) either suggested that no electronic transitions occurred or failed to frame their answers precisely enough to match the mark scheme. There were a few references to 'white light', when the burning of magnesium was confused with the heating of the compound, and some thought that the colour was due to the magnesium ion flame colour being masked by the colour of the Bunsen flame.

***(iii) Explain the origin of the flame colour.**

(3)

When a substance is put under a flame, the electrons become excited and ~~have~~ has a lot of energy, therefore the electron will jump up an energy level. when the electron goes back down to its original energy level. it releases energy. This energy is seen as a flame colour.

(iv) Suggest why compound A produces no flame colour.

(1)

There is no energy level higher to jump

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Examiner Comments

The description of the relevant electronic transitions was just sufficient to be awarded the first two marks but greater precision was needed for the final mark.

The attempt at 19(b)(iv) was typical. Less successful responses often suggested either that the electrons had insufficient energy to be excited to a higher level or that such a level did not exist.

Question 19 (c)

The majority of candidates understood the basic principles required by this question and there were some extremely well-structured answers. As elsewhere in the paper, potentially high-scoring responses were marred by imprecision, particularly in the identification of the polarising and polarised species.

*(c) When Group 2 metal carbonates are heated strongly, they decompose forming the metal oxide and carbon dioxide.

Explain why the thermal stability of the metal carbonates increases as the group is descended.

(3)

because as the group descends, the ions get larger in size. This means that because there is more shielding on the Group 2 ion, the carbonate is less distorted

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Examiner Comments

This candidate recalled some of the key points required by this type of question but, unfortunately, they were imperfectly understood. The polarising species was not identified and it was essential that the polarised species was accurately specified as 'carbonate' could refer to the compound or the ion.

ResultsPlus
Examiner Tip

Read what you have written and try to make sure that it conveys what you intend.

*(c) When Group 2 metal carbonates are heated strongly, they decompose forming the metal oxide and carbon dioxide.

Explain why the thermal stability of the metal carbonates increases as the group is descended.

(3)

going down group 2, the size of the cation increases, there is more electron shell shielding, so the polarising power of the cation decreases, which leads to less polarisation of the carbonate ion (anion), and so the metal carbonate is more stable

ResultsPlus
Examiner Comments

This response was concise yet covering all the key points. It can seem very straightforward!

Question 20 (a)

Many candidates still seem unaware that vague generalisations will rarely be sufficient at this level. Thus, while the idea that coal would generate more pollution was appreciated, the precise nature of this was not spelt out. Despite the short context introduction to the question, a common error was to assume that natural gas was a renewable resource or would not produce greenhouse gases.

20 Induced hydraulic fracturing, commonly known as fracking, which was developed in 1947, is a technique for extracting natural gas (mainly methane) from shale deposits. While natural gas is a much cleaner fuel than coal, it is difficult to carry out fracking without leakage. Because methane is a far more potent greenhouse gas than carbon dioxide, it has been calculated that leakage rates of around 2% are sufficient to increase global warming.

(a) Suggest what is meant by 'natural gas is a much cleaner fuel than coal'.

(1)

Burning natural gas produces less waste emissions than burning coal.

ResultsPlus
Examiner Comments

This typified the sort of vague response that scored zero.

20 Induced hydraulic fracturing, commonly known as fracking, which was developed in 1947, is a technique for extracting natural gas (mainly methane) from shale deposits. While natural gas is a much cleaner fuel than coal, it is difficult to carry out fracking without leakage. Because methane is a far more potent greenhouse gas than carbon dioxide, it has been calculated that leakage rates of around 2% are sufficient to increase global warming.

(a) Suggest what is meant by 'natural gas is a much cleaner fuel than coal'.

(1)

When it is burned it does not release unwanted and toxic products, and that can cause environmental damage.

ResultsPlus
Examiner Comments

Another example of generalities that gained no credit.

Question 20 (b)

There were many excellent answers to this familiar question but some candidates still referred to the absorption of infrared radiation from the sun. A small number of responses conflated the greenhouse effect and the depletion of the ozone layer.

(b) Explain how greenhouse gases cause global warming.

(2)

Green house gases absorbe solar radiation but do not release it effectivly trapping it here cause the planet to heat up.

ResultsPlus
Examiner Comments

A rare example where a candidate completely misunderstood the greenhouse effect.

(b) Explain how greenhouse gases cause global warming.

(2)

Greenhouse gases absorb infrared radiation due to their polar bonds, resulting in heat being trapped within the atmosphere, increasing the average surface temperatures around the world.

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Examiner Comments

The nature of the radiation absorbed was known but where it comes from or goes to was not specified.

Question 20 (c)

Most candidates were able to come up with a sensible scoring response to this question although a fair number suggested that the C−H bond were more polar than the C=O bond. Vague generalisations about carbon footprints and the like did not score.

(c) Suggest why methane is a far more potent greenhouse gas than carbon dioxide. blocking.
(1)

carbon dioxide is used by plants in photosynthesis whereas once methane is in the atmosphere it cannot be removed naturally.

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Examiner Comments

The candidate may well be thinking in terms of methane having a longer life in the atmosphere but has not quite said this.

ResultsPlus
Examiner Tip

Make sure that your response is as complete an answer to the question as you can manage.

Question 21 (a)

Only the less successful candidates were unable to work out the relevant oxidation numbers or were unable to state the meaning of the term disproportionation. Failure to identify the processes (oxidation or reduction) involved in the changes in oxidation state was the most common reason for the loss of a mark.

21

Swimming Pool Chemistry

The circulation of water in swimming pools is much slower than that in most natural water courses, but the number of people using a given volume of water is often far greater. If steps are not taken to keep microorganisms and other contaminants under control, the water will become hazardous. Filters are used to remove solid material and chemicals are added to disinfect the water.

The most common method of disinfection involves the use of chlorine compounds, but systems using bromine have advantages. These systems depend on their oxidizing properties. With chlorine systems, the key species is the chlorate(I) ion (OCl^-) which kills bacteria by damaging the structure of their cell walls and disrupting enzyme activity.

A simple way of adding chlorate(I) ions to water is by using chlorine. The weak acid, chloric(I) acid (HOCl), is formed and this dissociates producing the chlorate(I) ion.

(a) The equation for the reaction of chlorine with water is:

$$Cl_2(aq) + H_2O(l) \rightleftharpoons HOCl(aq) + HCl(aq)$$

By referring to the relevant oxidation numbers, explain why this is a disproportionation reaction.

(3)

Because chlorine ~~is~~ in a single species of Cl_2 is oxidised into Cl^- in HOCl where there is an increase in oxidation number from 0 to +1 but is also reduced to Cl^- in HCl where there is a decrease in oxidation number going from 0 to −1. The single species, Cl_2 is oxidised and ~~reduce~~ reduced to ~~prod~~ produce ~~the~~ 2 different products – HOCl and HCl.

ResultsPlus
Examiner Comments

The use of Cl^- in referring to the chlorine in HCl and HOCl spoils an otherwise excellent response.

ResultsPlus
Examiner Tip

Your use of terminology has to be accurate.

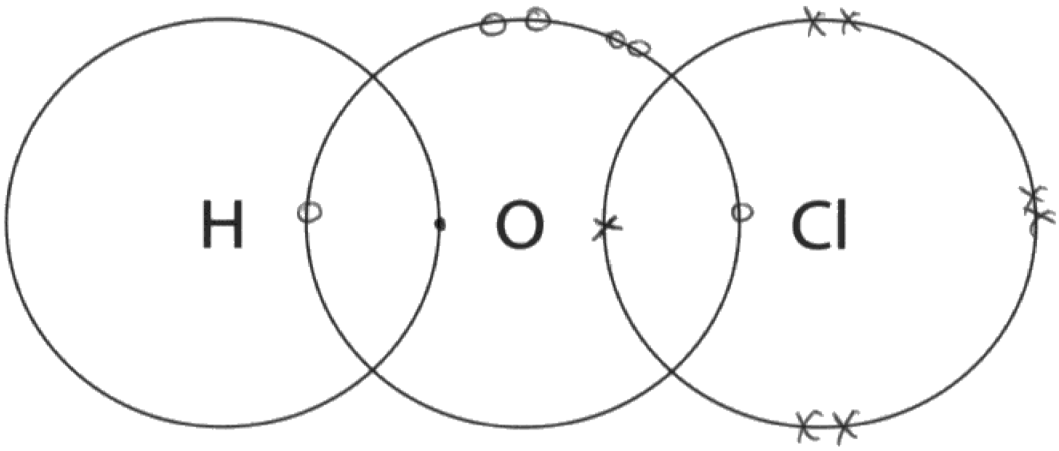
Question 21 (b)

Few candidates were unable to complete the dot and cross diagram, although some lost a mark by failing to use the required symbols or omitting the chlorine lone pairs. The bond angle in HOCl was usually given correctly, with frequent references to the analogous shape of the water molecule, but only the more successful candidates scored all four explanation marks. The better structured responses were most likely to lose a mark by omitting mention of the basic tetrahedral orientation of the valence shell electron pairs but for others the most common problem was a lack of clarity and precision in their explanation. There were frequent references to electrons rather than electron pairs and to the repulsion of atoms. The mark for stating that the valence shell electron pairs were oriented to minimise repulsion was often lost because the statement 'minimum repulsion or maximum separation' was often given without a context.

(b) (i) Complete the dot and cross diagram for chloric(I) acid (HOCl). Use a dot (•) to represent the hydrogen electron, circles (o) to represent the oxygen electrons and crosses (×) to represent the chlorine electrons.

Show the outer electrons only, but include non-bonding electrons.

(2)



*(ii) Predict the bond angle in chloric(I) acid. Explain your answer fully.

(5)

Bond angle = 104.5°

The Oxygen has 2 bonding pairs and 2 lone pairs of electrons.
Lone pairs of electrons repel more than bonding pairs.
So the 2 lone pairs of e⁻ on O repel the bonding pairs
and "bend" it. It exists at this angle because it is at
minimum repulsion.
There are 4 electron pairs on O, 2 bonding and 2 lone.

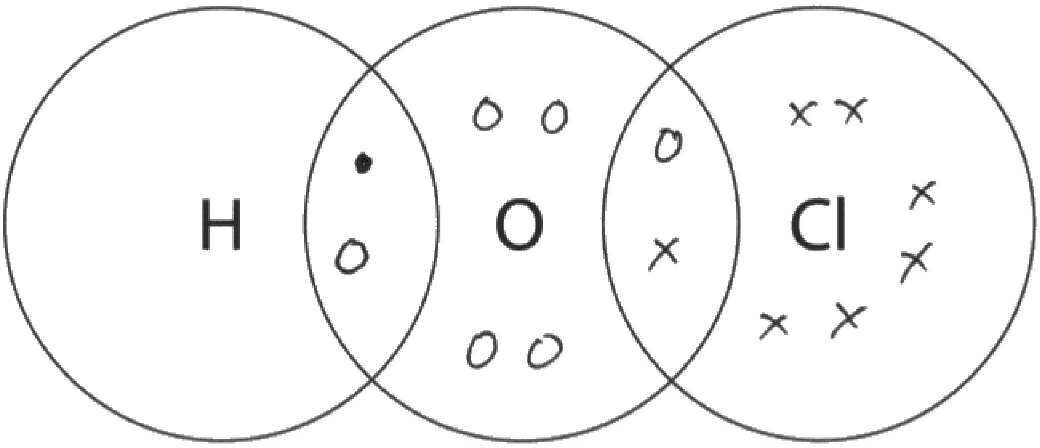
ResultsPlus
Examiner Comments

In this response 'it is at minimum repulsion' was simply not sufficiently precise to gain the third marking point. There was no mention of the tetrahedral shape.

(b) (i) Complete the dot and cross diagram for chloric(I) acid (HOCl). Use a dot (•) to represent the hydrogen electron, circles (o) to represent the oxygen electrons and crosses (×) to represent the chlorine electrons.

Show the outer electrons only, but include non-bonding electrons.

(2)



*(ii) Predict the bond angle in chloric(I) acid. Explain your answer fully.

(5)

Bond angle = 104.5°

~~This mole~~ chloric acid has ~~to~~ two bond pairs and two lone pairs, ~~This means in has a total of~~ around the central oxygen. This means it would form a tetrahedral arrangement with the four pairs, to ensure maximum seperation. Due to their only being ~~to~~ two bond pairs, the shape is a bent or V-shape. Due to the repulsion of the lone pairs, the bent angle is closed slightly from 109.5° to 104.5°.

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Examiner Comments

In this response 'due to the lone pairs' was not enough to score the fourth marking point.

Question 21 (ci)

There were many fully correct solutions to this calculation, often with full explanations of the stages. A few candidates were unable to progress beyond the calculation of the amount of thiosulfate in the titre but, of those that failed to gain full marks, the vast majority were due to an inability to convert the amount of chlorine into a mass. The use of the relative atomic mass of chlorine was a common error but many answers simply stopped at that point.

Question 21 (cii)

The idea that the swimming pool water would not be homogeneous was appreciated by a good number of candidates, however, all too many fell back on standard statements about experimental or apparatus error, which do not have a bearing on reliability.

(ii) Analysing a single sample of swimming pool water in this way is likely to give unreliable results because it is not possible to repeat the titration.
Suggest another way in which this method is unreliable.

(1)

May not be the same throughout the pool, as the circulation is slower than most bodies of water.

ResultsPlus
Examiner Comments

The candidate gave a good answer, drawing on the information in the passage as well as applying an understanding of experimental procedure.

(ii) Analysing a single sample of swimming pool water in this way is likely to give unreliable results because it is not possible to repeat the titration.
Suggest another way in which this method is unreliable.

(1)

~~Because~~ The ~~tit~~ titrant wasn't split into ~~3~~ different volumes to take ~~an ave~~ mean titre of the sample.

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Examiner Comments

Instead of thinking about the problem presented the candidate resorted to generalisations about causes of experimental uncertainty.

ResultsPlus
Examiner Tip

The command word 'suggest' indicated a question that required the application of appropriate concepts in novel contexts. At this level, reeling off general statements will not gain marks.

Question 21 (di)

For the most part, the candidates who failed to write this straightforward equation seemed not to have read the question and proposed a range of possible products, including, in a surprising number of responses, compounds containing bromine.

Question 21 (dii)

The link between London forces and the number of electrons was well known. The most common errors arose when candidates confused volatility and reactivity, leading to fruitless discussions of electronegativity, shielding and covalent bond strength.

Question 21 (ei)

Many answers simply reiterated the data in the table, without making any reference to equilibrium, once again failing to appreciate that this was unlikely to gain credit at this level, and failing to act on the fact that the equation was given as an equilibrium. Only the more successful responses utilised a logical sequence starting with the effect of pH on the concentration of hydrogen ions. Quite a number of candidates thought that increasing the pH would increase the concentration of hydrogen ions.

(e) The pH of the swimming pool affects the performance of the disinfectant. The data below show how the concentrations of bromine species vary with pH.

pH	% bromine as HOBr	% bromine as OBr^-
6.0	100	0.0
7.0	98.0	2.0
8.0	83.0	17.0
8.5	57.0	43.0

The equation for the reaction of bromic(I) acid in water is

$$HOBr(aq) \rightleftharpoons H^+(aq) + OBr^-(aq)$$

(i) Assume the pH of the swimming pool is neutral. Explain how any changes in the pH of the swimming pool affect the concentration of the bromine species.

(3)

A decrease in pH (to pH 6) will cause the equilibrium position to shift to the left, reducing the amount of H^+ ions and OBr^- ions and increasing the amount of HOBr. An increase in pH will make the solution less acidic, and so the forward reaction is favoured, producing more H^+ ions and more OBr^- ~~are (which are acidic~~) and so bringing the system back to the original pH.

ResultsPlus

Examiner Comments

To discuss the effect of pH on the position of equilibrium, required a statement about the effect of change in pH on the concentration of H^+ ions (marking point 1).

Question 21 (eii)

The majority of marks were awarded for the use of 'corrosive' to describe the effect of an alkali rather than the preferred 'caustic'. Far too many candidates just re-stated the fact mentioned earlier in the question that swimmers might be harmed, or suggested too that alkaline a solution would be harmful or damaging to the swimmers. The normal hazard associated with dilute alkali (irritant) was occasionally suggested. Less successful responses suggested that the swimming pool water would be toxic or damage the pool itself.

Paper Summary

Based on their performance on this paper, candidates are offered the following advice:

- read the questions. On this paper some candidates lost three or four marks by simply failing to answer the question, sometimes ignoring instructions given in bold type
- remember that the paper will test understanding as well as recall, so be prepared to apply your knowledge in unfamiliar situations
- practise writing with precision, especially when using technical terms.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

Llywodraeth Cynulliad Cymru
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