GCSE Examiners' Report

Chemistry

GCSE

Summer 2026

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Introduction

Our Principal examiners' report provides valuable feedback on the recent assessment series. It has been written by our Principal Examiners and Principal Moderators after the completion of marking and moderation, and details how candidates have performed in each unit.

This report opens with a summary of candidates' performance, including the assessment objectives/skills/topics/themes being tested, and highlights the characteristics of successful performance and where performance could be improved. It then looks in detail at each unit, pinpointing aspects that proved challenging to some candidates and suggesting some reasons as to why that might be.[1]

The information found in this report provides valuable insight for practitioners to support their teaching and learning activity. We would also encourage practitioners to share this document – in its entirety or in part – with their learners to help with exam preparation, to understand how to avoid pitfalls and to add to their revision toolbox.

Further support

Document	Description	Link
Professional Learning / CPD	WJEC offers an extensive programme of online and face-to-face Professional Learning events. Access interactive feedback, review example candidate responses, gain practical ideas for the classroom and put questions to our dedicated team by registering for one of our events here.	https://www.wjec.co.uk/home/professional-learning/
Past papers	Access the bank of past papers for this qualification, including the most recent assessments. Please note that we do not make past papers available on the public website until 12 months after the examination.	Portal by WJEC or on the WJEC subject page
Grade boundary information	Grade boundaries are the minimum number of marks needed to achieve each grade. For unitised specifications grade boundaries are expressed on a Uniform Mark Scale (UMS). UMS grade boundaries remain the same every year as the range of UMS mark percentages allocated to a particular grade does not change. UMS grade boundaries are published at overall subject and unit level. For linear specifications, a single grade is awarded for the subject, rather than for each unit that contributes towards the overall grade. Grade boundaries are published on results day.	For unitised specifications click here: Results, Grade Boundaries and PRS (wjec.co.uk)

[1] ***Please note that where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.***

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Exam Results Analysis	WJEC provides information to examination centres via the WJEC Portal. This is restricted to centre staff only. Access is granted to centre staff by the Examinations Officer at the centre.	Portal by WJEC
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Executive Summary

There has been a decrease in entries for Year 10 candidates. This increase is due to centres planning the removal of GCSEs in the separate sciences from their curriculum. The late announcement by Qualification Wales that they would continue, resulted in some centres not being able to include this option in their curriculum offering for September 2025. This is particularly evident in entries from Welsh-medium centres. The vast majority of the cohort sit the higher tier paper for Unit 1 and Unit 2 although some weaker candidates would have benefitted from sitting the foundation tier paper.

Foundation tier candidates attempted the majority of the foundation tier-only questions on the paper. The objective style of questioning and the use of multiple-choice options in much of this section made it accessible for all candidates. The common questions were found to be more challenging.

Candidates exhibit much better quantitative skills than qualitative skills. Questions that assessed mathematical skills were generally well attempted. Candidates should be encouraged to logically and clearly show their working so that some marks can be awarded even when the final answer is not correct. Graph plotting was good. Some candidates were able to write perfect chemical equations whilst at the other end of the spectrum some showed little understanding of how to give a chemical formula. As always, centres are encouraged to invest time in this area as all papers include a significant number of marks for these skills.

The quality of handwriting was sometimes very poor and this made it very difficult to read some responses, particularly so for the QER. Candidates need to take more care in reading the questions and taking note of information in tables and diagrams. As ever, performance in the QER questions was variable and very dependent on the topic. Questions that required descriptions and/or explanations were poorly answered by many. Recall of knowledge was as ever weak for candidates scoring around half marks.

In units 1 and 2, candidates experienced greater difficulty with questions requiring practical knowledge and understanding. In the practical assessment unit, as in previous series, candidates were largely successful in making hypotheses and in identifying variables. Notable areas that candidates found challenging were scaling graphs and lines of best fit. Using data to justify evaluations was also weak.

Our digital resources website offers blended learning lessons and knowledge organisers, among other materials. Please ensure you are accessing the correct site with legacy resources (GCSE Chemistry) and not the sister site for the new Made-for-Wales qualifications.

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CHEMISTRY

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UNIT 1: CHEMICAL SUBSTANCES, REACTIONS AND ESSENTIAL RESOURCES

FOUNDATION TIER

Overview of the Unit

The demand of the questions was comparable to that in previous series and the paper was a suitable and fair test for the candidates at foundation tier level. The degree of difficulty of the questions increased throughout the paper, with questions in the common section providing the most challenge.

The foundation tier-only section of the paper was generally well attempted. The objective style of questioning and the use of multiple-choice options in much of this section made it accessible for all candidates. Despite this, many candidates lacked the basic knowledge and understanding of the topics assessed through these questions and therefore made random guesses. There were also a few candidates who, through failing to read the question properly, selected an incorrect number of answers.

Questions that required descriptions and/or explanations were poorly answered, particularly when they required direct recall of knowledge. Where candidates did demonstrate some knowledge and understanding, many gave answers that were either too vague to gain credit or that did not specifically relate to the question.

As in previous years, very few candidates demonstrated the skills required to successfully answer questions relating to chemical formulae and writing equations. These questions continue to be poorly answered, despite being a key part of the assessment of chemistry and therefore having a significant number of marks allocated to them in each examination paper. Only some candidates were able to give the formula of a named compound, insert a number into a box to balance a given equation or complete and balance a symbol equation.

Questions that assessed mathematical skills were generally well attempted. However, too many candidates still lack the basic numeracy skills required to successfully access these questions. For example, many candidates were unable to identify the correct method for calculating a percentage by mass using a given relative formula mass.

The quality of graph work demonstrated by candidates was fair overall and most candidates were able to successfully plot points onto a given axis and draw a suitable line of best fit. However, there were still a small number of candidates who were unable to plot all points correctly and/or were unable to draw an appropriate line for the data.

The QER question was attempted by nearly all candidates. Most candidates gave a lower or middle band answer with only a very few accessing the top band marks.

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Comments on individual questions/sections

Question 1

Most candidates were able to select the correct answers from the given choices, although there were a significant number of incorrect guesses. Very few did not attempt these question parts.

Question 2

Almost all candidates were able to correctly identify elements in a key and use it to draw a molecule. About a half of candidates were able to give the total number of atoms in the formula H_2SO_4.

Question 3

Most candidates were unable to give the correct chemical formula for sodium oxide or potassium iodide. In part (b), very few gave a specific safety precaution for demonstrating the reaction of Group 1 metals with water. About two in five knew the expected observation when potassium reacts with water.

Question 4

Well answered by many. Three in five calculated the missing result in the table and almost all plotted the points accurately. Many lost the mark for the line of best fit.

Question 5

Only around one in four knew the limewater test observation but two in three correctly named calcium oxide. Calculating a percentage by mass is commonly asked and it was surprising that the mean mark for part (b) was only 0.6 out of 2.

Question 6

(a) The QER question was attempted by 9 out of 10 candidates. It was set on a familiar topic and included an element of data interpretation so all should have been able to give some creditworthy points. Lower and middle band answers were most common and many did not address all parts of the question. Only a very few accessed the top band marks by linking the given data to reasons for and against fluoridation.

(b) Few candidates understood how to carry out a solubility calculation and most were unable to use the graph to predict a solubility value not shown.

Question 7

Knowledge of the key points of the changes to the atmosphere over geological time and the modern atmosphere was variable with many easy marks lost. Candidates interacted well with the information given in part (c) where little recall was needed.

Question 8

Most could name the nucleus in part (a) and give the number of protons in (b)(i). Very few could concisely explain why an atom has no overall charge. Answers were usually vague and unclear rather than incorrect.

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In part (c), many candidates could identify atoms in the same group or the correct period but again few could clearly explain their reasoning. Common incorrect answers included ‘they both have two electrons’ and ‘it has three outer shells’.

Question 9

(a) Most candidates gained 2 or 3 of the five available marks. Identifying **E** as the gas used to sterilise swimming pools was the commonest correct answer. The least common correct answer was **D** as the metalloid. Candidates were awarded the mark if they gave the correct name of the element represented by the letter.
(b) Most candidates were unable to write the formula of aluminium bromide and were therefore not able to access the balancing mark.

Question 10

Candidates were generally able to place the water samples in order of hardness but again less able to explain their reasoning with much clarity. Few recalled the advantages of living in a soft water area and about two in five named calcium (or magnesium) as ions that cause hardness in water.

Question 11

Parts (a) and (c) are familiar questions on Wegener’s theory and plate tectonics. These were reasonably well answered although many again lost marks for using vague language rather than the appropriate terminology.

Most gained some credit for the calculation in (b)(iii) but few foundation tier candidates scored both marks.

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CHEMISTRY

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UNIT 1: CHEMICAL SUBSTANCES, REACTIONS AND ESSENTIAL RESOURCES

HIGHER TIER

Overview of the Unit

The demand of the questions was comparable to that in previous series and the paper was a suitable and fair test for the candidates at higher tier level. The degree of difficulty increased throughout the paper, with the most challenging questions towards the end.

All parts of the paper were well attempted, including the most demanding questions. Only a few candidates left question parts not attempted.

Performance on questions that required descriptions and/or explanations was often poor, particularly when direct recall of knowledge was required. Where candidates did demonstrate some knowledge and understanding, many gave answers that were either too vague or that did not specifically relate to the question.

Whilst most candidates were able to give formulae of simple compounds and/or balance a given equation, only a few could bring all these skills together to successfully complete or write a full symbol equation. Significant teaching time should be invested in these skills as they have a significant number of marks allocated to them in each examination paper.

Questions that assessed basic mathematical skills were generally well attempted, although calculations involving moles and/or reacting masses were overall quite poorly answered.

The quality of graph work demonstrated by candidates was generally good and nearly all candidates were able to successfully plot points onto a given axis and draw a suitable line of best fit.

The QER question had a very high attempt rate and healthy mean mark of 3.4 out of 6.

Comments on individual questions/sections

Question 1

Part (a) was well answered and many candidates gave the correct formula for aluminium bromide in part (b). Fewer were able to balance the equation.

Question 2

Almost all candidates were able to place the water samples in order of hardness and explain their reasoning clearly. Part (b) was the least well answered part where few could recall two advantages of living in a soft water area.

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Question 3

This question on Wegener's theory, the structure of the Earth and plate tectonics required some recall, data interpretation and mathematical skills and candidates performed very well in all parts.

Question 4

(a) In part (i), most candidates were able to describe the formation of acid rain and give an effect. Only about one in three recalled the idea of sulfur scrubbing in part (ii).

(b) Parts (i) and (ii) were well answered but only about one in nine clearly expressed an understanding of what is meant by a carbon-neutral fuel.

Most gave the correct formulae for carbon dioxide and water in the equation in part (iv) and a minority showed very good understanding by balancing the large number of atoms involved.

Question 5

(a) The QER question in part (i) was generally well answered. Most candidates accessed middle band marks and the mean mark was 3.4 out of 6. In order to be awarded a top band mark, it was necessary to refer to 'particles per unit volume' to explain the effect of increasing concentration and to 'energy' in the discussion of increasing temperature.

In part (ii), many candidates lost both marks for giving H rather than H_2 as the formula of hydrogen.

(b) Most candidates sketched the correct graph and gained both marks.

Question 6

(a) In parts (i) and (ii) the solubility calculation was well done and the graph was well plotted. Some lost the mark for the line by failing to use a ruler. There were several possible creditworthy points in comparing the solubilities of the compounds in part (iii) and most candidates gained at least one mark.

(b) Almost a half of candidates gave the correct formula for copper(II) nitrate in part (i) but most had little success in describing a method that would separate the given mixture. Many scored no marks and many others only 1 mark for a very general description without explanation.

(c) This percentage by mass calculation was well done with most gaining both marks.

Question 7

(a) This question required interpretation of a complex graph. This proved beyond almost all candidates resulting in a very low facility factor of 8%.

(b) Most candidates gained a mark for reasoning to oppose fluoridation but many failed to answer both parts of the question and did not refer to chlorination at all.

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Question 8

(a) Well answered with many candidates scoring all the marks.

(b) In part (i), the explanation of the link between metal reactivity, carbonate stability and time for decomposition generally lacked clarity. Most correctly gave the formula for sodium carbonate in part (ii).

Question 9

(a) Part (i) was fairly answered as candidates followed the examples in the table. The equation in part (ii) required candidates to predict the products of the reaction, work out their formulae and balance the equation. A mean mark of 1.4 out of 3 suggests that the stronger candidates performed well here. Surprisingly, only around one in three gave the correct electronic structure of a chloride ion in part (iii).

(b) Most candidates gained 1 mark for a generic description of isotopes but did not include the specific details for chlorine-35 and chlorine-37.

(c) This familiar calculation was well done by many but a good number inverted the mole calculation in the first step and got Fe_2Cl rather than $FeCl_2$. Stronger candidates could well have realised their mistake in this example as both ions appear in the ion table at the back of the paper.

Question 10

(a) Many candidates gained full marks for good explanation of Group 1 reactivity, although some lacked clarity in their answers.

(b) This reacting mass calculation was poorly answered in general. Some candidates comfortably gained all three marks showing clearly understood methods but many had no idea how to approach the problem. Some gained one mark for calculating the relative formula mass of lithium oxide.

(c) Reports on recent papers have drawn attention to poor knowledge of ion tests so it was pleasing to see that candidates performed reasonably in this question leading to a mean mark of 1.1 out of 2.

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CHEMISTRY

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UNIT 2: CHEMICAL BONDING, APPLICATION OF CHEMICAL REACTIONS AND ORGANIC CHEMISTRY

FOUNDATION TIER

Overview of the Unit

The demand of the paper was broadly comparable to last year. The paper proved to be of an appropriate level of demand with a pleasing mean mark of 43.6.

Candidates coped well with the foundation-only section of the paper mainly due to the number of multiple-choice questions. Performance on the common questions was poor. As in previous years, application and interpretation questions were better answered than recall questions.

Performance in basic numeracy was good. The quality of graph work was very good. Almost all candidates were able to successfully plot points on the grid but a significant number struggled to draw a curve of best fit.

As reported last year many candidates were unable to write numbers clearly, e.g. writing a '4' which looked like a '7′ or a '9'.

The QER question continues to highlight concerns about spelling, punctuation and grammar and illegible handwriting. Some candidates' responses consisted of a single sentence using all the available twelve lines.

As in previous years, some candidates failed to use the table of common ions at the back of the examination paper to help them construct chemical formulae.

Many topics in chemistry are best assessed through questions set in a practical context as in questions 2, 3, 4 and 9(b). Those candidates who have experience of similar practical exercises will always be at an advantage in answering these questions.

Comments on individual questions/sections

Question 1

(a) Part (i) was well answered. The most common reason for not achieving all four marks was the choice of 'thermochromic pigment' for use in dental braces. Two in three candidates gained the mark for part (ii). Those candidates who failed to achieve this mark gave either 'sticky' or 'waterproof' as the useful property of nano-silver in plasters.

(b) Most candidates were able to identify properties of graphite and diamond. The most common misconception was that only diamond has a high melting point.

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Question 2

(a) Surprisingly poorly answered. Many candidates were unable to identify the error in each diagram. Many obviously did not use the word equation provided to help them.

(b) This is a regular question on most chemistry papers and should be very easy for those who understand a simple chemical formula. Only a half of candidates were able to give the correct formula for magnesium chloride. The most common incorrect answer was Mg_2Cl.

(c) It was evident that many candidates simply guessed which answer to tick. It is disappointing that fewer than a half of candidates could identify the test for carbon dioxide.

(d) Most candidates identified filtration in stage **2** but many did not know that water is evaporated in stage **3**.

(e) This simple subtraction was done correctly by around 70% of candidates. Some added the two numbers whilst others multiplied or even divided one by the other.

Question 3

(a) Most candidates were able to interpret the pH scale in part (i), but fewer were able to apply their understanding in part (ii).

(b) Almost all candidates were able to interpret the information correctly in part (i) but just over three in five demonstrated the understanding needed to answer part (ii). Most candidates correctly identified that an indicator is used in a neutralisation reaction.

Question 4

(a) Almost all candidates were able to plot the points correctly but some failed to draw the smooth curve which fits the data.

(b) Only a third of candidates were able to interpret the graph to give the maximum increase in temperature. The most common incorrect answer was 64°C which is the maximum temperature reached during the reaction.

(c) Part (i) required candidates to complete a simple symbol equation. The names of the products are given. This type of question regularly appears so it was disappointing to see the same mistakes made as in previous years. Some candidates gave the formula $MgSO_4$ but then wrote the symbol for copper as Cu^{2+} or Cu_2. The multiple-choice style of part (ii) allowed four out of five candidates to show an understanding of displacement reactions.

(d) Both parts required candidates to use their experience of practical work in a familiar context. In part (i), only one in five candidates referred to the beaker increasing stability or reducing the chance of the cup falling over. The most common incorrect answers referred to the risk of 'burning your hands' as the temperature of the solution increases. In part (ii), the most common incorrect answer was to use the copper container.

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Question 5

(a) In part (i), candidates were instructed to choose from the raw materials *entering* the blast furnace. However, some candidates chose materials *leaving* the furnace e.g. 'molten iron' as a source of iron and 'molten slag' to remove impurities. Only two in five candidates were able to balance the equation in part (ii)I. The most common incorrect number added was '2'. In part(ii)II, just over a third of candidates knew that reduction is the term for the loss of oxygen.

Part (iii) was disappointingly answered with a facility factor of around 60%. Weaker candidates simply added the two relative atomic masses. A small minority listed the correct total relative mass for each element but then failed to add those together.

(b) The QER question was attempted by more than nine out of ten candidates. The mean mark was 3.1 out of 6 showing that most candidates were able to make some creditworthy points. The content required was very straightforward, but most candidates would have benefited from planning what they wanted to write before they started their response. Most chose suitable properties for each use. Weaker candidates gave vague or incorrect reasons why each property was important, e.g. 'aeroplane wings – low density *because it keeps the plane in the air*' and 'food containers – good heat conductor *because it keeps food warm*'.

As in previous years, the standard of spelling and grammar was sometimes poor and some candidates' handwriting was very difficult to decipher.

Question 6

(a) A reasonable performance overall on a topic that foundation tier candidates find difficult. In part (ii) only about two in five candidates were able to identify the two compounds that were alkanes. The most common error was selecting two alkenes.

(b) Part (i) was better answered than part (ii) with facility factors of around 70% and 60% respectively. The most common error in part (ii) was to multiply the bond energy of 464 by 2 rather than by 4, i.e. including only one water molecule in their calculation. Weaker candidates struggled with both parts.

In part (iii), only two in five candidates could identify the energy profile diagram for a reaction which gives out heat. Most chose the diagram which represents an endothermic reaction.

Question 7

(a) In part (iii)I almost all candidates recognised that the symbol represents a reversible reaction but the rest of part (a) was poorly answered. Most candidates appreciated that gases are being recycled via pipe A in part (i), however they needed to specify that it is the 'reacting gases' that are being recycled. In part (ii), only one in five candidates could recall that iron acts as a catalyst or that it speeds up the reaction. Performance in part (iii) demonstrated that the idea of a balanced equation is not well understood by foundation tier candidates.

(b) Reasonably well answered with most getting one of the two marks.

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Question 8

(a) Ionic bonding is a topic assessed regularly on this paper but performance this year was disappointing. The mean mark for part (i) was 1 out of 3. Most candidates gained a mark for the electronic structure of the oxide ion but many failed to give its charge. This is of course given in the ion table at the back of the examination paper. Many did not attempt to draw the outer shell of electrons on the oxide ion. In part (ii), only two in five candidates recalled the type of bonding present in magnesium oxide but in part (iii), around 60% correctly identified the structure present in solid magnesium oxide.

The inability to write the correct formula of magnesium oxide resulted in both marks being lost in part (iv). Most candidates failed to use the information in part (i) (or the charges given in the ion table) to arrive at the formula MgO. The most common incorrect formula was MgO_2. Very few candidates gained both marks.

(b) Electrolysis is a difficult concept for foundation tier candidates and responses in parts (i) and (ii) showed a clear lack of understanding of the process. Just over 10% of candidates gained the mark in part (i). The most common incorrect answer was carbon dioxide. Only one in five candidates gained the mark in part (ii). Many recognised the answer was 'zinc' but again did not use the table of ions to give the formula Zn^{2+}.

In part (iii), fewer than three in five candidates were able to work out that the zinc formed would be in the liquid state.

Question 9

(a) The contact process is regularly assessed on this paper but as in previous years, foundation tier candidates were unable to recall the key details and struggled on most parts of this question.

In part (i), only a third of candidates could recall or work out that sulfur reacts with oxygen to make sulfur dioxide. Perhaps not all read the information given in the first box. The most common incorrect answer was carbon dioxide. Only one in ten candidates gave the formula SO_2 in part (ii), showing a lack of knowledge of simple formulae and of the content required in this topic. The most common incorrect answer was SO.

Part (iii) required candidates to add up the numbers of different atoms in the reactants and match their answer to $H_2S_2O_7$. Around 55% managed to do this. Part (iv) required pure recall and was not well answered with only around one in five candidates gaining the mark.

(b) Most candidates gained marks in parts (ii), (iii) and (v) but poor recall cost an easy mark in part (i). Only one in ten candidates knew that the reaction of a metal with an acid produces hydrogen gas. A facility factor of just over 30% for part (iv) suggests that answers were mainly guesswork.

In part (v), most candidates gained both marks for this simple calculation but a small number failed to perform the subtraction to find the temperature increase. As in previous years, a few candidates included 20^3 in the calculation showing a complete misunderstanding of the difference between the value and the unit.

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CHEMISTRY

GCSE

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UNIT 2: CHEMICAL BONDING, APPLICATION OF CHEMICAL REACTIONS AND ORGANIC CHEMISTRY

HIGHER TIER

Overview of the Unit

This paper proved to be less demanding than last year's and candidates found it very much to their liking. The mean mark of 51.4 is significantly higher than last year's mean of 45.0. The QER question and chemical analysis differentiated well. Attempt rates were very high throughout the paper.

In general, application, analysis and interpretation questions were better answered than recall questions.

Mathematical work was generally good although candidates should be encouraged to clearly show their method so that some marks can be awarded even when the final answer is not correct. Graph plotting was as always very good.

As in previous years, performance on the QER question was weaker than on other questions with a facility factor of around 40%. More able candidates demonstrated good knowledge and understanding but too many gave answers which simply repeated information given in the question.

Most candidates were able to successfully complete and/or balance symbol equations however, only the more able demonstrated good understanding of an ionic equation.

Many topics in chemistry are best assessed through questions set in a practical context as in questions 1(b), 2(b), 3, 8(c) and 9(b). Those candidates who have experience of similar practical exercises will always be at an advantage in answering these questions.

Comments on individual questions/sections

Question 1

(a) Most candidates achieved two of the three available marks in part (i). If the third mark was not awarded, it was usually due to not including the electronic structure of the oxide ion. Part (ii) was correctly answered by almost all candidates. Two in three candidates selected the correct structure for magnesium oxide. Part (iv) was well answered although some gave the formula as MgO_2 which resulted in both marks being lost.

(b) Parts (i) and (ii) were relatively well answered with both facility factors around 65%. Most candidates identified the gas as chlorine in part (i). No credit was awarded for 'chloride'. Some would have benefited from referring to the table of ions at the back of the examination paper in answering part (ii). Part (iii) was well answered by higher tier candidates.

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Question 2

(a) Generally very well answered, however it was surprising to see around two in five candidates not being able to give the formula for sulfur dioxide in part (ii).

(b) Again very well answered, with the exception of part (i). Only around 55% of candidates were able recall that hydrogen is the gas formed when a metal reacts with a dilute acid.

Question 3

It is evident from most of the facility factors for this question that candidates lack hands-on practical experience.

(a) In part (i) just over 50% of candidates were able to identify a burette. More than one in four candidates incorrectly read the value off the scale in part (ii), usually giving 25.2 as the answer. Part (iii) was disappointingly answered. Some candidates were obviously unfamiliar with a titration method being used for a salt preparation. Only around one in three candidates stated that no indicator is used in step **6** to prevent the salt being contaminated. Many candidates lost the mark in part (iv) because they were vague in their language and did not clearly convey which step resulted in the formation of larger crystals.

(b) Surprisingly, around 40% of candidates were unable to give the state symbol ‘s’ for the silver chloride precipitate in part (i). Many showed a basic understanding of the method (and a lack of careful reading) by suggesting that the product was an aqueous solution. Part (ii) was very well answered.

Part (iii) tested a difficult idea but it did not work as intended and barely any candidates had the confidence to tick three boxes as required. Many candidates identified sodium and nitrate ions but not chloride ions.

In part (iv), only two in five gained the mark for making a specific reference to either ‘drying the precipitate’ or ‘removing water’. Many candidates failed to clearly express themselves and gave vague answers relating to purity.

Question 4

(a) The blast furnace is a topic assessed regularly on this paper but unfortunately many candidates were unable to recall the key details and struggled on parts (i) and (ii).

Part (i) clearly excluded reference to the production of carbon dioxide but many described the subsequent formation of carbon monoxide. This gained no credit. All that was required was a simple reference to the reaction being the source of heat for the furnace.

In part (ii), most candidates correctly recognised that reaction **2** is a reduction but many incorrectly stated that reaction **4** is an oxidation. A surprising number failed to work out the formula of iron(III) oxide and therefore gained no credit in part (iii). In part (iv), about 60% of candidates deduced the formula of slag from the equation for reaction **5**.

(b) This part required some extended writing so discriminated well. Only the most able gained all three marks. Most candidates recalled correctly that graphite contains delocalised electrons. Some referred to them moving between the layers and gained a

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second mark. Unfortunately, few stated that each carbon atom is bonded to three other carbon atoms rather than four. Many answers included reference to a 'sea of electrons' and weaker candidates sometimes referred to ions.

Question 5

(a) Surprisingly only three in five candidates could recall that air is the source of the nitrogen in the Haber process. As in previous years the term 'raw material' is poorly understood. 'Ammonia' was a common incorrect answer.

(b) Only weaker candidates failed to gain both marks for this part. Common incorrect formulae for ammonia were NH_4 and NH_2.

(c) Very well answered. A few candidates drew a 'line of best fit' but without visible plotted points. These were awarded only one of the three available marks. This is obviously not good practice and candidates must clearly plot the points.

(d) Part (i) was generally well answered. Weaker candidates often read both percentage yields correctly from the graphs but then carried out every type of arithmetic except subtracting one value from the other. Surprisingly some plotted all the points correctly in part (c) but were unable to read off the correct values in this part.

In part (ii), three in five candidates gained the mark. Incorrect answers included those which referred to cost (e.g. more expensive) or safety (e.g. could explode).

Question 6

(a) Part (i) was very well answered with a facility factor of almost 90%. Part (ii) was more challenging but a facility factor of 70% suggests good understanding from many.

(b) Most candidates showed a good understanding of bond energy calculations in parts (i), (ii) and (iii). Part (iv) was another poorly answered recall question. The activation energy was more often correctly labelled than the overall energy change.

(c) Almost all candidates answered parts (ii) and (iii) correctly in this PISA-style question. Two out of every three gained the mark for part (i).

Question 7

(a) Part (i) was well answered. Three in five candidates gained the mark for part (ii) where some misread the compound name and gave **C** rather than **D**.

Although part (iii)I was reasonably answered, it was obvious that not all candidates used the structural formulae of compounds **E** and **F** to work out the general formula of alcohols. The most common incorrect formula chosen was $C_nH_{(2n+2)}OH$.

In part (iii)II, only one in three candidates were able to recall the colour change when testing for an alcohol.

(b) It was surprising how many candidates struggled with this question. Only the more able candidate gained all three marks. Although the polymerisation of ethene is regularly tested, many candidates struggled to draw the correct repeating unit for polythene and a significant number left it blank.

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(c) It was pleasing to see the facility factor for this question at around 70%. The electronic structure for both elements was given in the question, so candidates should have appreciated that a maximum of 12 electrons were available to complete the diagram. One mark was awarded for a shared pair in each of the carbon-hydrogen overlap areas and another for two shared pairs representing a double bond between the two carbon atoms. Many lost a mark for including more than 12 electrons.

Question 8

(a) This was very well answered. Almost all candidates correctly rearranged the equation and the commonest error was not using the volume in dm^3 in the equation.

(b) The relationship between moles and mass was not given in this part so the facility factor was a little lower than in part (a). Many of those who didn't get the correct final answer gained a mark for calculating the relative formula mass of oxalic acid.

(c) A disappointing but not a surprising poor performance in this question. As in previous years, most candidates demonstrated poor recall in respect of chemical tests. As previously mentioned, practical experience would benefit all candidates in interpreting observations such as these.

The symbol of the ion was expected as shown in the example given for compound **A**, however many candidates chose to give the symbol and the name for the ion. This only gained credit only if both were correct. Compound **C** contains the ammonium ion and the carbonate ion. Many candidates gave 'ammonia' and 'carbon dioxide' which suggests a poor understanding of the last two tests.

Question 9

(a) It was very pleasing to see that around 70% of candidates correctly balanced this wholly unfamiliar equation.

(b) This QER question was attempted by almost all candidates, however the facility factor was only 40%.

It is a demanding question requiring clear understanding, correct use of scientific terminology and an ionic equation so differentiated well at the higher end of the ability range. The most able candidates usually structured their response logically and this helped them gain higher marks although very few candidates were able to write a correct ionic equation. Some attempted to follow the pattern seen in the ionic equation for a precipitation reaction [$Cu^{2+} + 2NO_3^- \rightarrow Cu(NO_3)_2$] but that gained no credit.

Middle band responses usually
- referred to a displacement reaction
- identified the grey solid as silver
- linked the blue colour to a solution containing 'copper'
- stated that copper is more reactive than silver

A top band answer required reference to ions and a reasonable attempt at an ionic equation or relevant half-equations.

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CHEMISTRY

GCSE

Summer 2026

UNIT 3: PRACTICAL ASSESSMENT

Overview of the Unit

In this unit candidates are assessed on their practical skills including, forming hypotheses, recognising and preventing hazards and risks, recording and presenting data, understanding the variables that are involved in experiments, evaluating the success of the experiment and planning improvements. There was evidence that candidates are familiar with practical work and the analysis of practical results.

Both tasks proved to be accessible for most candidates who usually attempted all sections. As in previous series, candidates were largely successful in making hypotheses and in identifying variables. Notable areas that candidates found challenging were scaling graphs and lines of best fit. Using data to justify evaluations was also weak.

Comments on individual questions/sections

Section A

Hypotheses and risk assessments
Most candidates were able to make a sensible hypothesis in both tasks, which linked the independent and dependent variables. Most candidates can make a reasonable hypothesis, identifying the expected relationship between the independent variable and dependent variable. However, some responses remained too vague to credit. A common error was failing to state how the dependent variable would change.

In producing risk assessments, the most successful candidates linked the risk with a particular action in the method. Weaker candidates identified risks that were not relevant to the method such as stating that hydrogel could be harmful if swallowed. In other cases, candidates identified a hazard but did not include a clear action such as touching or pouring.

Tables
Most candidates structured tables appropriately, with more consistent use of appropriate headings and units, and fewer errors such as abbreviated headings or units placed in the body of the table than in previous series. Weaker candidates made errors in calculating means correctly or rounding accurately. A small number of candidates failed to determine means.

Section B

Controlled variables
Both tasks included a section on variables. Candidates were usually able to identify the independent and dependent variables, and most were able to state the range of these variables when required. When describing controlled variables, candidates often did not provide both the value of the variable and how it was controlled. This was particularly evident where no numerical value was required and candidates needed to explain that the variable was kept consistent for each result. Weaker candidates selected variables that did not require control, such as timing in the hydrogel task. The use of incorrect terms such as

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‘amount’ in place of volume or concentration was still evident in the work of many candidates.

Graphs
Graphs were drawn more accurately than in previous years, with many candidates labelling axes and plotting points appropriately, however, several common errors remained. These include axes plotted the wrong way around, starting values on scales not given for both axes, and the use of awkward scales, for example intervals of 3.

Lines of best fit remained a key area of difficulty. Candidates were often unsure whether to use dot-to-dot plotting or a line/curve of best fit and frequently drew lines that did not leave an even spread of results on either side.

Candidates were asked to identify the relationship between the plotted variables and this was usually done well. Whilst most candidates were able to describe a relationship between the independent and dependent variables in the graph, a description of the shape of the graph, where it was required for the second mark, was poor. Many candidates used incorrect terminology, for example describing relationships as proportional when they were not or stating that change occurred at a constant rate when the graph was curved.

Processing data
Processing results was problematic in some cases, particularly in the hydrogel task when asked to calculate the increase in mass of the hydrogel from the starting mass, many candidates instead calculated the increase between consecutive results.

Where candidates were asked to determine values from graphs, they were generally able to read values from the x-axis accurately, but many struggled to identify the corresponding y-axis values using their chosen scale.

In common with previous series, calculations were often done well, however, as with mean calculations, rounding was often inaccurate.

Evaluation of results
Questions directly assessing understanding of repeatability and reproducibility were answered well however when judging repeatability, imprecise language often limited candidates’ access to marks. Many referred to “results” rather than “repeats”. Even where candidates used the term repeats correctly, few used data to support their judgement. Tasks requiring assessment of repeatability at a specific value of the independent variable were generally answered more successfully.

The use of data to support judgements of repeatability was generally weak. Rather than describing variation within sets of repeats or comparing each set with the mean, candidates often quoted one or two individual values. For reproducibility, candidates usually recognised the need to compare with other groups, but weaker responses suggested more repeats or asking other groups to repeat the experiment without explicitly comparing results or identifying whether patterns were similar.

Inaccuracies and improvements
The quality of responses varied significantly**.** Some candidates were able to identify specific inaccuracies in the method and suggest a suitable linked improvement. However, many candidates gave generic improvements, such as “take more repeats” or “take more care when obtaining results”, rather than linking the improvement directly to the identified issue. Others suggested inaccuracies that would not have affected the results, for example better controlling the volume of water in the hydrogel task, despite the water always being in excess.

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Planning

Planning questions were generally answered more successfully than in previous years, and candidates often identified the dependent variable correctly. However, the range of independent variable values was sometimes insufficient, with some candidates providing only two or three values rather than the required four. Common errors in identifying controlled variables included stating only one variable instead of two, repeating the independent variable rather than identifying a suitable control variable or selecting an irrelevant variable.

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