

GCSE
Chemistry
8462/2F

Report on the examination

Version: 1.0
June 2025

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Question 1

- 01.1 Three quarters of students scored at least one mark on this item. The most common mark was for putting the wire into the flame. Students should be encouraged to state that the wire is placed in a blue flame when describing a flame test. Many students described the metal wire as being placed under, over or on a Bunsen with no mention of a flame.
- 01.2 There were nearly two thirds of students who scored at least one mark for this question. Students knew the flame colour for potassium more frequently than that for lithium.
- 01.3 Carbon dioxide was identified by two thirds of students.
- 01.4 Only a quarter of students correctly identified barium chloride solution. Sodium chloride solution was the most common distractor.
- 01.5 Fewer than 1 in 5 students correctly identified a precipitate as a solid. Most students gave a liquid as the answer.
- 01.6 Fewer than 20% of students correctly identified both precipitate colours. The most common error was identifying the copper precipitate as green. The magnesium precipitate was given the full range of colours available.
- 01.7 2 in 5 students correctly identified the iodide precipitate as yellow. The other options were both frequently seen.

Question 2

- 02.1 Half of the students correctly identified the alkene as propene. Both butene and ethene were commonly seen.
- 02.2 Over 80% of students were able to give the number of atoms in the molecule as 9.
- 02.3 Over two thirds of students correctly identified the use of alkenes.
- 02.4 Nearly 80% of students scored all three marks for plotting the bar chart. Of the remaining students, most scored two marks, the most common error was to plot the bar at 92, rather than 86.
- 02.5 The test for alkenes is not well known. Slightly more than 1 in 10 students scored either mark on this question. A full range of tests was seen, with nearly 30% of students did not attempt this item.

- 02.6 Nearly two thirds of students correctly completed the formula in the equation. Many students recognised that the number should be 7, but did not follow the conventions of writing formulas, so did not gain the mark because the 7 was too large. When writing formulas, it is expected that the tops of numbers are discernibly below the tops of upper-case letters.
- 02.7 Over half of students correctly identified the use of alkanes as fuels. Both distractors were frequently seen.
- 02.8 Nearly 90 % of students correctly answered this item.
- 02.9 Three quarters of students correctly compared the rates, with many explaining why the rate changes using the ideas from the previous item.
- 03.1 The reversible symbol was identified or correctly described by three quarters of students. Those that did not gain the mark talked about the 'equals sign' or the 'reversible sign' without a description.
- 03.2 Nearly 9 in 10 students correctly identified the type of reaction as 'endothermic'.
- 03.3 Well in excess of half of students correctly calculated the energy change. The methods employed were varied, with none being more common.
- 03.4 Around half of students correctly identified both materials. Many students completely reversed the responses. If 1 mark was awarded it was most likely for correctly identifying the reinforcement.
- 03.5 Over half of all students

Question 3

- 03.1 The reversible symbol was identified or correctly described by three quarters of students. Those that did not gain the mark talked about the 'equals sign' or the 'reversible sign' without a description.
- 03.2 Nearly 9 in 10 students correctly identified the type of reaction as 'endothermic'.
- 03.3 Well in excess of half of students correctly calculated the energy change. The methods employed were varied, with none being more common.
- 03.4 Around half of students correctly identified both materials. Many students completely reversed the responses. If 1 mark was awarded it was most likely for correctly identifying the reinforcement.
- 03.5 Over half of all students were able to identify iron. Aluminium and copper were the most frequently seen incorrect answers.

- 03.6 Three quarters of students correctly identified clay. Poly(ethene) was the most common incorrect response.

Question 4

- 04.1 Around 40% of students correctly identified both sources of the gases. There is a strongly held misconception that hydrogen comes from the air.
- 04.2 Nearly half of students understood that cooling occurs at point X in the diagram. The two distractors were both equally commonly seen.
- 04.3 Around half of students knew that iron was used as a catalyst in the Haber process.
- 04.4 Over 90% of students correctly identified the trend from the given data.
- 04.5 Nearly three fifths of students achieved all four marks on this scaffolded calculation. Taking the correct numbers from the table was the most common step where students did not gain credit.
- 04.6 About half of students scored the mark for this item. Change in amount of acid rain was the more common distractor seen.
- 04.7 Nearly 4 in 5 students correctly identified both compounds that contain nitrogen. Most of the remainder gained one of the two marks.

Question 5

- 05.1 A third of students gained all three marks, completing a clear diagram of the chromatography required practical. The details of what was required were included in the instructions, however many students did not seem to read the instructions, as labels were frequently missed. Another point worth noting was that nearly 20% of students made no attempt to answer this item. This suggests that some students are not reading all the given information. The information given in exam papers is designed to support students in answering the questions.
- 05.2 Over half of students knew why a pencil, rather than a pen, was used to draw the start line. Many others struggled to express themselves with the clarity that was expected.
- 05.3 Nearly 60% of students scored all three marks on this familiar calculation. The students who scored nothing were unable to rearrange the equation. Some students gained 1 mark for substituting values into the given equation, but then not rearranging correctly.
- 05.4 Only one third of students knew that measurements need to be made to the centre of the spot. Both the distractors were commonly seen.

- 05.5 Three quarters of students scored at least 1 mark for this question. The most common distractor was leaving for a different length of time.
- 05.6 Two thirds of students correctly gave 1 as the number of spots produced during the chromatography of a pure substance.
- 05.7 Over 4 in 5 students gave the correct response of more accurate.

Question 6

- 06.1 Nearly 80% of students completed the line of best fit.
- 06.2 Two thirds of students correctly read 40% from the graph. The most common incorrect response was 24%, which corresponds to 3.25 billion years ago.
- 06.3 3 in 5 students correctly identified that carbon dioxide dissolving in water caused the concentration to drop initially.
- 06.4 Over half of students knew that the percentage of nitrogen increasing in the atmosphere was caused by volcanic action.
- 06.5 Knowledge of the changes of the atmosphere over time was known by fewer than half of the students.
- 06.6 Fewer than 20% of students identified both gases in the Earth's early atmosphere. Hydrogen and helium were the two distractors that were seen most.
- 06.7 Over half of students correctly identified the process as photosynthesis. Respiration and combustion were the two most common incorrect answers.

Question 7

- 07.1 Half of students correctly calculated the mass of gold in an 18-carat ring.
- 07.2 Two thirds of students identified the ratio correctly. The most common incorrect response was the wrong way round, 1:3.
- 07.3 Half of students knew that copper and silver are used in gold jewellery.
- 07.4 A common question applied to an unfamiliar context saw students struggle, even given the diagrams to help. Many students answered in terms of 24 carat gold, where the question was in terms of 18 carat gold. A common error was the idea that the metal used for alloying was harder than gold, so making the alloy harder. Reference to the given diagrams was absent. Another example of information given being ignored by students.

07.5 Half of students gained this mark, usually for the idea that iron rusts.

Question 8

08.1 Just over half of students gave the correct answer here. Many who did not gain the mark did not give the required comparative answer.

08.2 A third of students correctly identified the dependent variable. The most common incorrect response was the volume of seawater.

08.3 There was little understanding of heating to constant mass. It was clear that few students used the method to help support their answer and so most answered in terms of looking in some way to see if the water was still there – touch it/ use a paper towel/ stir it etc. The most common response was to heat for longer or heat over 100°C.

08.4 The clarity of expression of students meant that only 1 in 5 students gained this mark. Often mass was not mentioned, or the calculation was the wrong way round. Using the mass of the basin and 10cm³ of water was also commonly seen. Students often did not go back to the method to aid them in answering this item.

08.5 Over half of students gained 4 of the 5 marks on this calculation. The most common error was not converting the volume at all or converting it incorrectly. Another error seen included taking anomalies out of the data given. If anomalies are present, students will be told to ignore anomalous results. Students also sometimes forgot to divide by 4 to get a mean. Marks could be awarded for other steps when one step was completed incorrectly.

08.6 Fewer than a quarter of students correctly suggested that samples were taken from different areas in the sea. Many re-worded the question.

Question 9

09.1 Fractional distillation was given by about 40% of the students. Few of the rest gave distillation alone, the most common incorrect responses were cracking and fracking.

09.2 Just over a quarter of students correctly identified both changes of state. It was clear that many students did not understand what a change of state and only gave a state at each point.

09.3 Two thirds of students correctly identified petrol from the table.

09.4 A third of students made the correct link between boiling point and flammability, gaining a mark for this item.

- 09.5 Half of students wrote out the correct molecular formula, using the expected format. Some students wrote general formulas, and some had the carbon and hydrogen atoms the wrong way round.
- 09.6 A quarter of students named butane correctly. Propane was the most common incorrect answer.
- 09.7 2 in 5 students balanced the equation correctly. A further 25% balanced one of the two components.

Question 10

- 10.1 Over half of students achieved a Level 1 response for comparing the values given in the table. To achieve a higher level, links were required, why comparisons made a difference, and a judgement was required for Level 3. Too many students quoted values from the table with no 'added value' and no credit was given for this.
- 10.2 Around a third of students scored at least one mark on this item, usually for the idea that water, air or oxygen could not react with the aluminium. Far fewer students were able to explain the specification point that the oxide provides a barrier. Students who described sacrificial protection gained no marks for this question, whereas those that described the reaction as rusting limited their response to one mark.
- 10.3 A quarter of students correctly identified that a formulation would have fixed quantities of all components.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results Statistics](#) page of the AQA Website.