



General Certificate of Secondary Education

Science B 4462 / Chemistry 4421

CHY1 Unit Chemistry 1

Report on the Examination

2007 examination - January series

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Contents

Science B / Chemistry CHY1

Foundation Tier CHY1F.....	5
Higher Tier CHY1H.....	7

Science B / Chemistry Foundation Tier CHY1F

General

There were seven questions on this paper. The first five questions were targeted at grades E, F and G. The last two questions were targeted at grades C and D and were common to both Foundation and Higher Tier.

The majority of candidates appeared to have sufficient time to complete their paper. Candidates should be reminded to write their answers clearly in blue or black ink and within the space provided. Note that when candidates gave several answers when only one or two were required, they risked not being credited for their correct ideas if errors or contradictions were included in their response.

Fundamental knowledge and understanding of 'How Science Works' in the world at large, as well as in the laboratory, are tested throughout this paper. This means that candidates should be reminded that it is essential to first read all of the question carefully, analyse the information provided and think about their response before writing their answer.

Question 1 (Low Demand)

The description of an element proved difficult for the majority of candidates, but most were able to label correctly the parts of a lithium atom.

Question 2 (Low Demand)

The question was answered correctly by most candidates. Where errors were made, these were mostly in identifying the colourless liquid as water. Sieving was a common, correct answer in (b)(ii) but distillation and evaporation were not awarded marks.

Question 3 (Low Demand)

The most common answer was tungsten, because, of all the metals listed it had the highest melting point. However, aluminium and copper were sometimes incorrectly chosen for their good electrical conductivity.

In part (b) most candidates did not know that argon is used in light bulbs because it is unreactive or because it is a noble gas. Many candidates incorrectly selected oxygen, for these wrong reasons, either because it allows substances to burn or because it burns easily.

Question 4 (Low Demand)

The majority of candidates understood the formula CaCO_3 in part (a) and almost all could suggest a reasonable safety precaution that should be taken when heating limestone.

Most candidates were able to name quicklime / calcium oxide but found part (b)(iii) more difficult.

In part (c) candidates could usually give one reason for recycling glass but struggled to produce a second reason. The most common correct suggestions were to conserve resources, to reduce the use of landfill or to save energy. In general candidates appeared to be aware of the environmental problems that can be caused by quarrying and associated activities. The job/trade opportunities afforded by the quarry were often given as an advantage, although quite a number of candidates thought that the availability of limestone or the use of the quarry to dump waste were more important.

Question 5 (Low Demand)

Many candidates could not name the polymer made from ethene; the most common incorrect answer was plastic. The rest of part (a) was completed correctly by most candidates.

A surprising number of candidates did not attempt part (b)(i). Those who did often lacked the accuracy required to draw the bar for the hydrocarbon with nine carbon atoms. Some candidates forgot to label the bar.

In part (b)(ii) most candidates appreciated the relationship between the number of carbon atoms and the boiling point. Description of the separation of fractions from crude oil was not well answered. Several candidates thought that the process was cracking, although many candidates did gain one mark for correctly stating that the process was distillation.

In part (c) candidates could usually give part of an explanation for their chosen method for the disposal of plastic bags but struggled to produce a full explanation.

Question 6 (Standard Demand)

There were poor answers to part (a), although some candidates did gain credit for simply mentioning radioactivity.

The majority of candidates were only credited with one mark in part (b). This was often because both parts of their suggestions were related to the same evidence, that is, the two continents, and the sedimentary rocks appear as if they had once been joined.

There were good responses to part (c). Most candidates were aware of the link between plate boundaries and volcanoes and earthquakes.

Question 7 (Standard Demand)

Surprisingly, most candidates only gained one of the marks in part (a). Carbon dioxide was often given as one of the main gases and several candidates were confused about the percentages of nitrogen and oxygen present in the Earth's atmosphere. The majority of candidates did not appear to know that sulfur dioxide can cause acid rain.

In part (b)(ii), the responses given usually did not answer the question asked; for example common incorrect answers were use gas-fired power stations or don't burn coal. Most candidates did not seem to understand the word equation for burning methane in air.

In part (c) many candidates understand that carbon dioxide is a greenhouse gas and contributes to global warming. Some candidates appreciate the consequences of global warming. Again several candidates incorrectly linked carbon dioxide to holes in the ozone layer. The last part required candidates to use the diagram to explain this method of preventing carbon dioxide from entering the atmosphere. Most candidates gained at least one mark, although many candidates incorrectly thought that the carbon dioxide could be stored to be used as a fuel when the oil ran out.

Mark Ranges and Award of Grades

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

Science B / Chemistry

Higher Tier CHY1H

General

There were five questions on this paper. The first two questions were targeted at grades C and D and were common to both Higher and Foundation Tier. The last three questions were targeted at grades A and B.

The majority of candidates appeared to have sufficient time to complete their paper. Candidates should be reminded to write their answers clearly in blue or black ink and within the space provided. Note that when candidates gave several answers when only one or two were required, they risked not being credited for their correct ideas if errors or contradictions were included in their response.

Fundamental knowledge and understanding of 'How Science Works' in the world at large, as well as in the laboratory, are tested throughout this paper. This means that candidates should be reminded that it is essential to first read all of the question carefully, analyse the information provided and think about their response before writing their answer.

Question 1 (Standard Demand)

Part (a) attempted to lead candidates to consider why the early estimates of the Earth's age, based on its rate of cooling, were now considered to be far too low. Very few candidates gave the desired answer, that radioactive decay means that the Earth is cooling far slower than expected. Many candidates did gain credit for simply mentioning radioactivity.

Part (b) was well answered by the majority of candidates, although a significant number gave the same answer twice that the continents had once fitted together, based on the shapes of their coastlines and the fact that the areas of fossil containing sedimentary rocks would also be together. The most common, correct answers to the last part were volcanoes, earthquakes and tsunamis. A few candidates gave hypotheses rather than evidence, such as convection currents in the mantle.

Question 2 (Standard Demand)

Whilst the majority could identify the two main gases in air, a significant number chose carbon dioxide or hydrogen as one of them, and others struggled with the percentages.

Part (b) started well with most identifying acid rain as the environmental problem caused by sulfur dioxide. There were many good attempts at methods of reducing the problem, but quite a lot thought that it would be easy to remove the sulfur from coal before it was burned. Unexpectedly, the word equation proved difficult, especially the product water, hydrogen was the most common error. The problems caused by carbon dioxide were well known and generally well explained. As usual, there were a lot of other environmental problems attributed to carbon dioxide, including acid rain, holes in the ozone layer and global dimming.

Answers to part (d) tended to be too descriptive, not explaining how the carbon dioxide was being prevented from entering the atmosphere.

Question 3 (High Demand)

Surprisingly, candidates found part (a) difficult. Few could explain what an ore was. Acceptance of reduction, displacement and redox in part(a)(ii) meant that many candidates got the mark, but a disappointing number gave oxidation and even chemical reaction as the answer. A lot of candidates could not balance the equation, with a large number writing iron as Fe₂.

Part (b) was less of a problem as most candidates answered this well.

There were a variety of possible correct responses to part (c). Few candidates picked up all three marks although there were a lot of good, if not complete, explanations. A minority blamed unrecycled iron for global warming, global dimming, destroying the ozone layer and acid rain.

Question 4 (High Demand)

In part (a) most candidates had an understanding of unsaturated and the bromine test. Predictably, some did get the tests the wrong way round and clear was misused as a description for colourless. The hardening of oils was reasonably well known. Some candidates struggled to remember the word chromatography. The interpretation of the chromatogram caused few problems until the last part. Here, the subtle difference between the composition of the colourings and the different dyes meant that few scored both marks.

Question 5 (High Demand)

Not surprisingly, most found this to be the most difficult question. Few gained all three marks for a basic description of fractional distillation. Those that did answer well often included very good diagrams. Most candidates got the formula of butane correct and could draw a correct, structural formula for propane.

There were many incorrect and vague answers to part (c). A common response for part (c)(i) was 'because they are very useful' while for part (c)(ii) C₄H₈ and C₃₆H₇₆ were often given.

In part (c)(iii) suggestions tended to concentrate on raising or lowering prices, rather than solving the problem of a low supply and a high market demand for the C₅–C₈ fraction.

Mark Ranges and Award of Grades

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