



General Certificate of Secondary Education

Science B 4462 / Chemistry 4421

CHY1F Unit Chemistry 1

Report on the Examination

2010 Examination – June series

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Science B / Chemistry
Foundation Tier CHY1F**General**

There were six questions on this paper. The first four were targeted at grades G, F and E. The last two were common to Foundation and Higher Tiers. They were targeted at grades D and C.

The mark scheme was designed to allow candidates to gain marks for showing knowledge, understanding and application of chemistry. The majority of candidates appeared to have sufficient time to complete the paper and very few questions were left unattempted. Most candidates followed the instruction to draw a ring around the correct word to complete the sentence although several candidates selected more than one word and so did not receive any credit.

Basic knowledge and understanding of how science works in everyday situations, including in the laboratory, are tested throughout this paper. This means that it is essential that candidates read and analyse the information provided, then read the question before writing their response. Many candidates would have gained better marks if they had been able to express themselves more clearly.

Question 1 (*Low Demand*)

- (a) The majority of candidates knew that limestone could be used as a building material.
- (b) The majority of candidates were able to identify that one possible advantage for the people who lived near to the limestone quarry was that it could provide jobs.
- (c) Many candidates just stated environmental pollution or emissions without giving the type of environmental pollution or the type of emission. However, most candidates did score two marks here. The most popular correct answers were dust, noise and pollution caused by carbon dioxide in exhaust gases.
- (d) Most candidates correctly gave O as the symbol for oxygen. The number of oxygen atoms in the formula CaCO_3 was often stated incorrectly as being two.
- (e) Most candidates correctly gave calcium oxide as the compound with the formula CaO . A few candidates thought incorrectly that the name of the compound was calcium oxygen.

Question 2 (*Low Demand*)

- (a) Most candidates recognised that steel is an alloy of iron. However, several candidates thought incorrectly that steel is an ore of iron.
- (b) The majority of candidates did draw the bar correctly. It would have been helpful if candidates had used rulers. Some candidates drew a bar at 0.4 instead of 4. Very few candidates lost the mark for being outside the tolerance of half a square.
- (c) Most candidates correctly referred to the higher percentage of carbon in cast iron. There were some very good answers related to why the structure of cast iron causes it to be brittle. Many candidates did not gain the mark because they just suggested a higher percentage without stating that the higher percentage was of carbon and not iron.

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- (d) (i) Most candidates correctly worked out that the percentage of iron in this type of stainless steel was 73.8%.
- (d) (ii) The majority of candidates correctly identified that it was mild steel that contained 0.2% carbon.
- (d) (iii) Most candidates knew that stainless steel is resistant to corrosion.

Question 3 (Low Demand)

- (a) Most candidates followed the instruction and drew one straight line from each possible environmental problem to the correct emission that caused the problem, with most candidates scoring all three marks.
- (b) (i) The fact that incomplete combustion of oil or coal is caused by too little oxygen was known by most candidates.
- (b) (ii) The knowledge that incomplete combustion of oil or coal leads to the formation of carbon monoxide was known by most candidates.
- (c) (i) Most candidates answered correctly that the world production of oil was predicted to decrease. However there were a few candidates who when they looked at the years 2000 to 2200, wrote that production would increase because 2200 is a higher number than 2000.
- (c) (ii) Most of the reasons that gained credit were based on the idea that oil is running out and that there is a lot of coal available. It was apparent from some of the responses that many candidates did not know that coal was a fossil fuel. These candidates thought that coal was renewable and could be reformed from decaying plants within a period of a few years. Many candidates thought that coal was less polluting than oil.

Question 4 (Low Demand)

- (a) (i) Most candidates answered correctly that the number of colourings in the fizzy orange drink is two. However, many candidates found it difficult to interpret the simple chromatogram. The most common incorrect answer was five.
- (a) (ii) Most candidates correctly selected E104 and indicated that the spots or colours were either at the same height or matched in some way. A common incorrect answer was E110 because it was highest on the paper. Several candidates found it difficult to express the idea that there is a match between E104 and one of the colours in the orange fizzy drink. A typical example of this was the vague explanation that it shows it on the graph.
- (b) (i) The reason that an artificial colouring is added to some fizzy orange drinks is not just to give it colour. Most candidates were aware that these colourings are added to make the drink look nicer. Several candidates did not gain credit because they stated that the artificial colouring added flavour or taste or texture to the orange fizzy drink.
- (b) (ii) Artificial flavouring was the most common correct answer followed by carbon dioxide and sugar. Several candidates did not gain credit because they stated
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that the substance was an E number or a colouring. A few candidates thought incorrectly that the response required a problem caused by the orange fizzy drink, such as, rotting teeth, upset stomach or heart attacks.

- (c) (i) The majority of candidates knew that a plastic is made by many small molecules called monomers joining together to form very large molecules called polymers.
- (c) (ii) Reasons such as harmful to animals, pollution and bad for the environment were often given but not credited. There were many good responses relating to recycling the bottles, lack of landfill space and that the plastic might not biodegrade. The part was related to reasons for not dumping plastic bottles in landfill sites and yet some candidates expressed concern that burning plastic would produce carbon dioxide and harmful fumes.

Question 5 (Standard Demand)

- (a) (i) The ISAs have made most candidates aware of anomalous results in experiments. After selecting the correct company and pad there were a few candidates who did not gain further credit because of vague explanations such as the number is too low. Common incorrect responses were Company C Pad 3 because it has the lowest number and Company B Pad 1 because it has the highest number.
- (a) (ii) This was answered well. Most correct answers referred to the volume of water used although some candidates incorrectly gave the volume of water collected.
- (a) (iii) Reasonably well answered with most candidates opting for the measurement of the water as a potential error. A few candidates gave suggestions that were too general, for example human error or errors in measurement without specifying the actual error in this context.
- (b) (i) This part was not answered well. Many candidates thought that company B was the best and lost one mark, however, most candidates did gain one mark with the idea that the nappy pad would absorb more water or that Aqanaps wanted to be the best company. It was clear that a sizeable minority of candidates misinterpreted the data in the table, believing that the better nappies collected more water in the measuring cylinder.
- (b) (ii) Reasonably well answered with many candidates identifying that it would cost Aqanaps more money or reduce their profits. However, there were several candidates who talked about a disadvantage to the baby, the parents or the environment, rather than a disadvantage to the company as stated in the question.

Question 6 (Standard Demand)

- (a) (i) This part was poorly answered with very few candidates gaining even one mark. Often candidates assumed that the water vapour could be converted into a different gas, such as oxygen or nitrogen. Other candidates did not appreciate the time interval between the Earth's early atmosphere and the Earth's atmosphere today and thought that the water vaporised and disappeared at the high temperature (400°C) on the Earth's surface.

- (a) (ii) This part was poorly answered with very few candidates gaining both marks. By far the most common correct response was that plants use carbon dioxide and change it into oxygen, although several candidates stated that plants breathed in or sucked in carbon dioxide. Reduced volcanic activity was the most common incorrect answer. Again there was an unexplained change of carbon dioxide into a different gas, such as oxygen or nitrogen. Very few candidates knew that carbon dioxide dissolves in sea water.
- (b) (i) This question was well answered with a majority of candidates realising that the Earth's core is inaccessible. However, the lack of evidence comment with no explanation did not gain any credit.
- (b) (ii) This question was poorly answered by candidates. A few candidates gained two marks for realising that the controversial theory involved convection currents in the mantle. Some candidates mentioned radioactive processes but many of these thought that these processes would cause nuclear explosions causing the tectonic plates to move.

Mark Ranges and Award of Grades

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