



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

General Certificate of Secondary Education

Science B 4462 / Chemistry 4421

CHY1F Unit Chemistry 1

Report on the Examination

2009 Examination – January Series

Further copies of this Report are available to download from the AQA Website: www.aqa.org.uk

Copyright © 2009 AQA and its licensors. All rights reserved.

COPYRIGHT

AQA retains the copyright on all its publications. However, registered centres for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to centres to photocopy any material that is acknowledged to a third party even for internal use within the centre.

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales (company number 3644723) and a registered charity (registered charity number 1073334). Registered address: AQA, Devas Street, Manchester M15 6EX
Dr Michael Cresswell Director General.

Science B / Chemistry Foundation Tier CHY1F

General

There were six questions on the 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 un-attempted.

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.

Question 1 (*Low Demand*)

In part (a) the majority of candidates understood that an element is made up of the same type of atoms.

Most candidates in part (b) were able to identify that an alloy is a mixture; an alloy is made up of more than one type of metal; stainless steel is hard because different sized atoms change the structure of iron and that smart alloys can return to their original shape after being deformed. 'Polymer' and 'molecule' often appeared as incorrectly selected words.

In part (c)(i) most candidates were able to use the information provided to explain why recycling used steel cans is a good idea.

In part (c)(ii) candidates provided many correct, good ideas about how the local council could increase the percentage of steel cans that are recycled, such as, provide recycling containers, recycling collections, provide information about the benefits of recycling, run competitions, give rewards for recycling or fines for not recycling. Those candidates who did not score a mark usually suggested 'make more cans' or just stated 'recycle them'.

Question 2 (*Low Demand*)

Many candidates in part (a)(i) did not understand how the chemical formula represents the number of atoms of each element.

In part (a)(ii) the majority of candidates were aware of the position of the nucleus and the electron in the diagram of an atom. The most common error was to label the electron as a bond.

In part (b)(i) candidates were instructed to use the information in the diagram however, there were several other fuels suggested such as petrol, diesel, paraffin, crude oil and coal. As this was a low demand question, the answer 'methane and air' was accepted for one mark.

Most candidates in part (b)(ii) understood that carbon dioxide is the gas formed when calcium carbonate decomposes.

The information and table were used correctly by the majority of candidates in part (c)(i) to give the reasons why local residents were concerned about the cement works burning a different fuel. The main correct answers were linked to asthma attacks, cancer and dirty cars. A reason linked to a possible harmful environmental effect such as global warming, global dimming or acid rain, was also given credit.

In part (c)(ii) many candidates did not state what evidence they would want or need to decide if the company's statement was true or not. Most of these candidates just gave a judgement on whether or not they thought the statement was correct. Most marks were gained by suggesting a comparison of the smoke particles emitted by the different fuels or by comparing the medical condition of the residents before and after burning the new fuel.

Question 3 (Low Demand)

In part (a)(i) the majority of candidates used the diagram and understood that the oil is obtained from the crushed seeds by pressing.

The majority of candidates in part (a)(ii) again used the diagram and understood that the oil does not dissolve in water.

In part (b) the test using bromine to detect carbon carbon double bonds was well known.

Most candidates gained a mark in part (c) for comparing the boiling points of water and sunflower oil or by stating that a high temperature or a temperature above 100°C is needed to make crisps. Many suggested that the water would evaporate above 100°C and the potato would burn. These candidates would have gained credit if they had stated that at these temperatures water would evaporate from the thin slices of potato to form crisps. Ideas that were not credited were that 'the oil would cook them quicker' or that 'there was less saturated fat in sunflower oil'.

There was a large number of candidates in part (d)(i) who thought that the addition of Sudan 1 would improve the taste rather than the appearance of the chilli powder.

In part (d)(ii) the correct answer that Sudan 1 could cause cancer was often given.

A surprising large number of candidates in part (e)(i) did not recognise that the process shown was chromatography.

Despite the fact that the Specification includes 'detection and identification of artificial colours by chromatography', most candidates showed little or no understanding of the test results in part (e)(ii). These candidates often expressed their answers in terms of 'low = safe' and 'high = unsafe'. Candidates who gained marks usually did so by stating that the chilli powder was unsafe to eat or that one of the dyes was unsafe.

Question 4 (Low demand)

The majority of candidates in part (a) recognised that the centre of the Earth is known as the core.

In part (b)(i) candidates were provided with information on the Richter scale chart that they could use to suggest why most earthquakes in the UK are not reported. However, many candidates did not gain the mark for responses such as, 'damage to buildings was not too bad', or 'the newspapers did not want to panic people'. Those candidates that used numbers from the Richter scale frequently stated that these earthquakes were about 5 instead of 3 or below.

In part (b)(ii) the size of the earthquake in Kent was usually correct.

In part (b)(iii) most candidates knew that moving plates causes an earthquake. However, there was still a large number of candidates who stated that earthquakes are caused by the sea or by the weather.

Most candidates in part (b)(iv) confused the prediction and the detection of earthquakes. Answers were based on the severity of the earthquake being insignificant. Again a large number of candidates thought that people living in Kent were not warned about the earthquake because it could scare them or cause panic. The centre of the earthquake was under the sea and this produced several incorrect answers, such as, 'it could not be seen' or 'people in Kent lived too far away'. However, a reasonable number of candidates did appreciate that earthquakes are unpredictable or random.

Question 5 (Standard Demand)

In part (a)(i) it was surprising how many candidates did not know the name of the polymer made from ethene.

Many candidates in part (a)(ii) thought that carbon dioxide was used in 'the process' and not given off. Those candidates who had not read all of the information stated that 'carbon is very expensive so that is why there is a carbon cost.' A reasonable number of candidates did manage to gain a mark here for stating that heat or energy was needed or that carbon dioxide was given off during the cracking of a hydrocarbon.

Most candidates gained marks in part (b) by suggesting that 'more plastic bottles should be recycled in the UK' or that 'all the water should come from the UK'. There were a few candidates who gained the mark for mentioning that 'less distance travelled would reduce the carbon dioxide emitted by transport'. A few candidates suggested inappropriate solutions, such as: 'sending all the used plastic bottles to Asia', 'drinking less water' and 'putting all the used plastic bottles into landfill'. Very few responses suggested reusing the empty plastic bottles or drinking tap water instead of bottled water.

Question 6 (Standard Demand)

In part (a)(i) a majority of candidates gained the mark here however, several wrote about 'hydrocarbons' instead of 'carbon atoms'. Too many candidates used the phrase that it 'takes longer to boil' when they really meant that if there were more carbon atoms, then the boiling point would be higher.

Most candidates in part (a)(ii) could not understand and apply the information they were given to suggest the lowest temperature needed to vaporise all the hydrocarbons shown in the table.

In part (a)(iii) most candidates did not appreciate that the temperature of boiling and of condensing are the same for dodecane.

The idea of supply and demand was understood by most candidates in part (b)(i). Many candidates were able to use the bar chart to compare the supply and the demand for the two fuels. A few candidates suggested that the oil is running out so that is why there is not enough petrol.

In part (b)(ii) there were very few correct suggestions however, some candidates did appreciate that petrol could be made from the excess diesel. Others suggested correctly that the prices of the two fractions should be adjusted to balance the supply and demand for the two fuels.

Mark ranges and award of grades

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