



**General Certificate of Secondary Education**

**Additional Science 4463 /  
Chemistry 4421**

**CHY2F      Unit Chemistry 2**

**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](http://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.*

---

# Chemistry

## Foundation Tier CHY2F

### General

This Report should be read in conjunction with the published Mark Scheme.

#### Question 1 (*Low Demand*)

In part (a) many of the candidates gained this mark but there were also many careless errors. The symbols should be capital letters and the numbers should be subscripts –  $C_3H_8$ . Common incorrect answers were  $C^3H^8$ ,  $C_3h_8$ , and  $C_3 + H_8$ .

Part (b)(i) was correctly answered by most of the candidates. A number of candidates circled more than one answer. Some candidates did this in a number of questions and consequently could not gain marks in those questions.

Part (b)(ii) was also well answered but a significant number chose ionic bonding.

The candidates found part (c) very hard. All combinations of answers were seen.

#### Question 2 (*Low Demand*)

Only about one third of the candidates answered part (a) correctly. Anhydrous copper sulfate was a common incorrect answer.

Many of the candidates answered part (b) correctly but a significant number thought that heat would help the vapour to condense.

Part (c) was very well answered. The most common incorrect answer was 'equal amounts of reactants and products'.

In part (d)(i) most of the candidates were able to correctly calculate the average.

The majority of the candidates gained at least one mark and many gained two on part (d)(ii). The most common incorrect response was, 'The student used more ice in one of the experiments'.

The colour change on adding water to anhydrous copper sulfate was not well known in part (e). All combinations of colours were seen.

#### Question 3 (*Low Demand*)

A wide range of answers was accepted in part (a) and most of the candidates gained this mark. Common incorrect answers referred to; 'making it easier to rub against each other', 'prevention of rust', 'prevention of sparks' and 'stops metals sliding over each other or reacting'.

In part (b)(i), most of the candidates correctly identified the element as carbon. The most common incorrect answer was silicon.

In part (b)(ii) many candidates recognised the significance of layers but fewer were able to explain that they can slide over each other. Vague answers referred to atoms being far apart or close together, and references to lubrication.

#### Question 4 (*Low Demand*)

Part (a)(i) saw the majority of the candidates gaining this mark but 'decrease' was commonly chosen.

For part (a)(ii) most candidates chose the correct answer 'high melting point' but a significant number chose 'low melting point'.

Most of the candidates gained one mark and many gained two in part (b)(i). Some candidates still confuse time taken with reaction rate.

Part (b)(ii) was very well answered with many of the candidates gaining both marks. 'It increases the concentration of the particles' was the most common incorrect answer.

### **Question 5 (Low Demand)**

Most of the candidates correctly stated that the hydrogen ions must have a positive charge in part (a).

About half of the candidates identified chlorine as the gas produced at the positive electrode in part (b). Hydrogen was the most common incorrect answer.

In part (c)(i) less than half of the candidates were able to identify the alkali as sodium hydroxide.

About one third of the candidates gained the mark in part (c)(ii). Poor answers referred to the alkali reacting/neutralising with acid, hair, skin or body fluid. Vague ideas mentioned the hair shifting, moving or being pushed out. Many candidates wrote at great length about electrolysis and movement towards electrodes.

### **Question 6 (Low Demand)**

Part (a) was generally well answered. Some candidates missed the point and referred to descriptions of the butyl layer involving strength and protective properties.

Part (b) was very poorly answered. The majority of candidates gave the incorrect answer, 'a layer millions of atoms thick'.

The majority of the candidates scored at least one mark on part (c) and many gained two. Weaker candidates erroneously described the effects of the escape of the air in the tennis balls on the environment.

### **Question 7 (Standard Demand)**

Part (a) was well answered by many of the candidates. Some candidates did not understand the chemical formula and gave  $56 + 32 + 16 = 104$ . A small number of candidates multiplied the relative atomic masses.

Part (b) was poorly answered with many of the candidates making no attempt. Candidates were allowed to carry forward an error from part (a). Examiners simply looked for the candidate's answer to part (a) in grams.

In part (c) very few candidates were able to work out the calculation and many made no attempt. A number of them gave 152 multiplied by 28 and gained an answer of 4256.

### **Question 8 (Standard Demand)**

The majority of candidates completed the electronic structure correctly in part (a)(i). A few candidates gave the structure as 2.4 or 2.8. Some candidates added an extra shell.

Part (a)(ii) was answered correctly by the majority of the candidates. A few candidates gave 'neutron' instead of 'nucleus'.

Foundation candidates found part (b) difficult. A simple answer such as 'the O-18 nucleus contains two more neutrons' was all that was required for the 2 marks. Some candidates thought that the nucleus contains electrons or gave vague answers such as 'it contains more protons and neutrons', 'they have different sized particles' or 'they have different relative atomic masses'.

**Question 9 (Standard Demand)**

Parts (a), (b) and (c) were testing the ability of the candidates to read and comprehend a scientific passage and to apply their knowledge of 'How Science Works'. It is perfectly acceptable in this type of question for the candidates to pick out relevant information directly from the passage to form their answer. Parts (a), (b) and (c) were often well answered.

A statement such as 'he made urea using chemicals from non-living things' was sufficient to gain the mark in part (a).

A wide variety of responses were accepted in part (b). This is indicated in the question by the command 'Suggest'. A sensible suggestion based on their knowledge of 'How Science Works' was required. Many very good answers were seen which explained that he had only made one organic compound so that there was not enough evidence. Other candidates suggested that scientists at the time might have considered the production of urea to have been an anomalous result. Suggestions related to the possible low standing of Wöhler in the scientific community were also accepted. Many candidates missed the point of the question and gave vague answers, either relating to the lack of equipment or technology in 1828 or to the fact that animals produce urine, and did not gain credit

Answers such as 'he made another compound' and 'there was more evidence' were accepted in part (c). Some candidates simply restated their answer to part (a), 'he made an organic compound', which was insufficient to gain this mark.

Few candidates named the acid correctly in part (d)(i). Errors included; 'nitrate acid', 'nitrogen acid', hydrochloric acid and sulfuric acid.

Part (d)(ii) was poorly answered. Many candidates stated 'electrolysis' and seemed to think that they were extracting lead from the solution. A fair number of candidates simply gave 'filtration'. Other incorrect responses included 'freeze', 'melt' and 'react with acid'. Answers such as 'evaporation' or 'crystallisation' were accepted.

Part (e) proved to be very difficult for the Foundation Tier candidates with many of them making no attempt. Simple answers such as, 'In method 1 there are more reactants used and more wasted products', were sufficient to gain two marks. Use of chemical terminology was often poor with the words reactants and products being used interchangeably by a number of the candidates. There were many vague references to elements, things and materials.

**Mark ranges and award of grades**

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