



**General Certificate of Secondary Education**

**Applied Science 4861**

**APSC/2H Science for the Needs of Society**

**Report on the Examination**

*2008 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 © 2008 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.

## General comments

The three standard demand questions provided a positive start for most candidates and the majority seemed to be able to cope with the level of demand in questions 4, 5 and 6. Questions 8 and 9 proved to be particularly demanding and only the most able candidates scored well throughout the paper. The paper discriminated between different levels of ability and produced a wide range of total marks.

### Question 1

Responses to **1(a)(i)** were surprising in that a number of candidates thought that water contained the minerals required. A common incorrect answer to **1(a)(ii)** was water. Answers based on the loss of soil were fairly common in **1(a)(iii)** but they were not given any credit. It was interesting to note that a number of candidates thought this was done to prevent photosynthesis.

A good proportion of the calculations in **1(b)(i)** were correct but many candidates made a careless error to obtain a number close to the correct answer of 1307. A simple description of the results could gain full marks in **1(b)(ii)** and many scored well on this question. Question **1(b)(iii)** was answered well. Linking the addition of nitrate to the extra growth of the plants was the most common way for candidates to score the mark.

Only a minority of candidates suggested organic farming methods (eg the use of manure) in their response to **1(c)**, and very few were able to explain that the nutrients would be released more slowly and not be as easily washed away. There were a few answers based on crop rotation but descriptions of the use of greenhouses, the erection of barriers or the use of biological pest control were not given any credit.

### Question 2

Question **2(a)** was well answered. A wide range of responses was accepted, so a large proportion of candidates scored the mark.

Most candidates were able to give the correct chemical name for quicklime in **2(b)** but fewer were able to give the chemical name for slaked lime.

A good number of candidates were able to get all three formulae required in **2(c)(i)** correct, the formula for oxygen was the one most often being given wrongly, with candidates writing the formula for a single oxygen atom. Question **2(c)(ii)** proved difficult. Few candidates realised that the combustion of coke gives out the heat energy required for the decomposition of limestone. Many thought that carbon dioxide was needed for the decomposition of limestone.

Many candidates were able to match at least one point from the marking scheme in **2(d)**.

### Question 3

A high proportion of candidates scored the mark for **3(a)(i)**. Question **3(a)(ii)** was generally well answered, many candidates scoring full marks for the calculation; however, 70% was a fairly common incorrect answer.

Question **3(b)(i)** was well answered, most candidates scoring the mark for stating that the initial cost puts off consumers although other disadvantages of using low energy light bulbs were well known. Some candidates performed calculations in **3(b)(ii)** using data from the table but some did not provide any explanation for their calculation so were limited to just 1 mark.

Generally **3(c)** was answered well and many candidates were able to match two points from the marking scheme.

### Question 4

The full range of marks available in **4(a)(i)** was scored, with some candidates obtaining all 4 marks. Some candidates confused the trachea with the oesophagus but most were at least able to label the position of the lungs. Some excellent answers to **4(a)(ii)** were seen but some candidates wrote contradictory statements and were not able to match more than one or two of the marking points.

Some responses to **4(b)** described measurement before and after exercise but failed to say how to carry out the measurement. A surprisingly large number of candidates based their answer on pulse or heart rate and therefore did not score any marks.

A good number of candidates gained both marks to **4(c)**.

### Question 5

Although **5(a)** was poorly answered by many candidates, there were a good number of excellent responses that merited all 4 marks.

The examples of uses of materials in **5(b)** were taken directly from the specification but the questions were not as well answered as expected. Many candidates incorrectly chose limestone for **5(b)(i)**. Silicon (perhaps referring to a use of silicone), was a fairly common incorrect answer for **5(b)(iii)**. Aluminium was the most popular choice for **5(b)(iv)** and carbon for **5(b)(ii)**.

Relatively few candidates were successful in **5(c)**. It was surprising that the formula for the chlorine molecule (**5(c)(i)**) was not well known; it is listed in the Appendix of the specification as one of the formulae that should be learned for the examination.

### Question 6

Question **6(a)** was generally well answered. Many candidates scored full marks for this question but a significant number used the wrong formula and divided the numbers so gained no credit.

Question **6(b)** was less well answered. A greater proportion of candidates used the wrong formula and multiplied the numbers together instead of dividing. Some candidates calculated change in speed but this alone was not deemed worthy of any credit.

Question **6(c)** discriminated well and produced the full range of marks. It was disappointing that many candidates made errors when obtaining information from the graph.

## Question 7

Although responses to 7(a) demonstrated that ‘nucleus’ was well known, ‘chromosome’ and ‘allele’ were seen much less often.

A wide range of responses was seen to 7(b)(i). Some candidates were unable to offer any response but there were some very good answers, which included clear and well labelled diagrams that scored all 4 marks. A common incorrect answer to 7(b)(ii) was  $\frac{1}{2}$ . Only a small proportion of candidates scored the mark for 7(b)(iii) for suggesting the transfer of genes. Many candidates scored at least 1 mark in 7(b)(iii) for answers relating to ethical objections or referring to the uncertainty of results from an untested technique.

## Question 8

The composition of the different types of mixture was not well known but many candidates scored marks in the second part of each question for a common sense application of the information given on the product labels.

## Question 9

Answers to this question were generally poor.

Responses to 9(a)(i) demonstrated that the correct type of bonding in hydrocarbons is not well known. Ionic was a common wrong answer. Very few candidates were able to show in their answers to 9(a)(ii) that they understood that it is the weak force of attraction between molecules rather than the strong covalent bonding between the atoms in a molecule that is the important factor here.

A good proportion of candidates were able to deduce the correct formula for heptane in 9(b).

Candidates obtaining both marks in 9(c) were rare. Answers based on melting point were common but were not given any credit.

Question 9(d)(i) was well answered, many candidates scoring the mark. A simple description of the patterns in the numbers enabled a good number of candidates to score both marks in 9(d)(ii).

Surprisingly, a fairly high proportion of candidates did not obtain the mark in 9(e)(i). Many scored 1 mark in 9(e)(ii) but surprisingly few referred to the production of carbon monoxide despite that fact that it was shown clearly in the equations.

## Mark Ranges and Award of Grades

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