AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

General Certificate of Secondary Education

Applied Science 4861

APSC/2F   Science for the Needs of Society

Report on the Examination

2008 examination – January series

General Comments

The entry was larger and held a wider ability range than for the first paper in June 2007. The change to 70% low demand and 30% standard demand questions was intended to make the whole paper more accessible to lower ability students. It was encouraging to see that the style of questions enabled the least able candidates to score marks, especially on the more structured parts of the first five questions. Question 6 and the three standard demand questions at the end of the paper proved to be more challenging and achieved good discrimination.

Question 1

Candidates scored well on this question and it provided a positive start to the paper for most.

Question **1**(a) provided an easy start for all candidates.

Most candidates scored full marks for the labels in **1**(b)(i). Nearly all scored well in **1**(b)(ii) but a range of marks was seen with 'decreases' a fairly common incorrect answer to the last part. The full range of marks was scored in **1**(b)(iii). Answers based on pulse or heart rate were common but they could not be awarded full marks.

Question 2

Many candidates scored 2 marks for **2**(a), but malleable and high density were common incorrect answers.

Sulfur was the expected answer to **2**(b)(i) but carbon (diamond) was allowed as an alternative. Carbon was a commonly seen correct answer to **2**(b)(ii). Silicon was a common incorrect answer to **2**(b)(iii) – perhaps candidates were confusing it with 'silicone' sealant. Aluminium was a very common correct answer to **2**(b)(iv).

Responses to all three parts of **2**(c) made it clear that many candidates were guessing. In **2**(c)(i) less than one-third chose the correct answer (protons), neutrons being the most popular answer. The correct response in **2**(c)(ii) was the most popular answer with almost 50% of candidates scoring this mark. Almost 50% of candidates selected the correct response in **2**(c)(iii).

Question 3

Many candidates produced correct graphs in **3**(a)(i) but some drew bar charts or vertical lines. Some failed to plot a point at the origin and some plotted the points but did not draw a line of best fit. A high proportion of correct responses to **3**(a)(ii) was seen but many candidates confused thinking distance with thinking time. A good number of candidates scored the mark in **3**(a)(iii). Credit was given to answers that had been correctly obtained from an incorrect graph. Question **3**(a)(iv) proved to be a difficult question, with relatively few candidates scoring marks. Few realised that it was necessary to refer back to the table to obtain thinking distance at the stated speed.

Question **3**(b) was well answered. A variety of correct answers was seen but a number of candidates referred to a factor that affects thinking distance rather than braking distance and so did not score the second mark.

Question **3**(c) was also well answered. Some answers were too vague to obtain a mark but most candidates scored at least 1 mark.

Question 4

Most candidates scored marks in **4**(a) and the full range of marks was awarded.

Although an encouraging number of candidates obtained full marks, **4**(b)(i) was poorly answered by a larger proportion and eye colours were often missing completely from the second line. Just over half the candidates selected the correct response to **4**(b)(ii).

Question **4**(c)(i) provided an easy mark, with two-thirds of candidates selecting the correct response. Question **4**(c)(ii) was also well answered, cancer being the most common response that was given a mark.

Question 5

In their answers to **5**(a) many candidates confused emulsion and suspension but most scored at least 1 mark for this question.

Phosphoric acid was a commonly given incorrect answer for **5**(b)(i) and **5**(b)(ii). Sugar was a common correct answer for **5**(b)(iii).

The non-biodegradability of plastic and the visual pollution caused by litter was the subject of the majority of correct answers to **5**(c)(i). The fact that the use of non-renewable resources causes environmental pollution was also acknowledged in the mark scheme. Because incineration and recycling were expected as possible answers to **5**(c)(ii) it was surprising that some candidates included them as a reason why plastic causes environmental pollution: some stated that (some) plastics cannot be recycled and others stated that the combustion of (some) plastics release toxic fumes. The majority of candidates scored the mark in **5**(c)(ii). Question **5**(c)(iii) was answered, with aluminium being the most popular correct answer. Copper, tin and even plastic were quite common but were not awarded any marks.

Question 6

Many candidates scored 1 mark in **6**(a)(i) for stating that carbon and hydrogen are present in a hydrocarbon but very few scored the second mark for stating **only** carbon and hydrogen. Oil was a common correct answer to **6**(a)(ii). Responses to **6**(a)(iii) showed that distillation is a well known method of separation. Differences in boiling point were the most common way of scoring the mark for **6**(a)(iv). Some candidates repeated the statement about pentane in the stem of the question but this could not be given any credit.

A good proportion of candidates correctly named water and carbon dioxide in **6**(b).

Although few candidates scored both marks for **6**(c)(i), many were able to name one of the toxic products. Question **6**(c)(ii) was generally well answered but a number of candidates did not obtain any marks because their answers were too vague (eg 'pentane causes pollution'). It is surprising to note that some candidates think that fossil fuels are associated with damage to the ozone layer.

A wide range of responses was seen to **6**(d). Many candidates named renewable energy sources rather than alternative fuels for motor vehicles.

Question 7

In question **7**(a)(i) marks were not awarded for answers that implied that the minerals were present in the water that was added to the plants. When candidates write a list (eg soil, sun, air) that includes some wrong answers they will not be awarded any marks. Water was a common incorrect answer to **7**(a)(ii) and many candidates simply repeated minerals already named in the question. Answers to **7**(a)(iii) that were based on the loss of soil were fairly common but could not be given any credit. It was interesting to note that a number of candidates thought this was done to prevent photosynthesis so the plants would not gain weight.

A good proportion of the calculations in **7**(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 **7**(b)(ii) and many scored well on this question. Question **7**(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 **7**(c), and very few were able to give an explanation of the chosen method. 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 8

A wide range of responses was accepted in **8**(a), so a large proportion of candidates scored the mark.

Many candidates were able to give the correct chemical name for quicklime in **8**(b); fewer were able to give the chemical name for slaked lime.

Relatively few candidates were able to get all three formulae required in **8**(c)(i) correct, the formula for oxygen most often being given wrongly. Question **8**(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.

Most were able to match at least one point from the marking scheme in **8**(d).

Question 9

A good proportion of candidates scored the mark for **9**(a)(i). Common incorrect answers to **9**(a)(ii) were 18 and 70.

Question **9**(b)(i) was well answered, most candidates scoring the mark for stating that the initial cost puts off consumers. Some candidates performed calculations in **9**(b)(ii) using data from the table but some only quoted data and did not carry out a calculation so were limited to just 1 mark.

Generally **9**(c) was answered well. A common suggestion was to advise customers not to leave their televisions on standby.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.