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General Certificate of Secondary Education

Applied Science 4861

APSC/2H Science for the Needs of Society

Report on the Examination

2009 examination – January series

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General comments

A particular issue that appeared in this paper but had not been noticed before was converting units in calculations. Candidates should be told to emphasise where they are placing the decimal place in answers and about correctly rounding. It was surprising how many are getting even simple chemical formula wrong

Question 1

1a) This was generally answered well, although some candidates misinterpreted the question and gave answers relating to intensive farming.

1b) Again, there was some reference to intensive and organic farming in this question. Those candidates who understood the concept being tested misread the stem of the question and referred to GM foods in their answer without specifying GM and therefore lost marks.

1ci) A few candidates wrote general words to do with photosynthesis, eg, soil, light, plants and some got the two gases the wrong way round but otherwise answered well.

1cii) Candidates generally gave acceptable answers but many just described photosynthesis instead of focussing on the term being tested.

1d This question was answered well.

Question 2

2a) This question was mainly answered well. The most common mistake was in referring to high boiling point and high melting point or using the word strong. Candidates should be able to identify that high tensile strength is not the same as high compressive strength.

2c) Here a number of candidates just described the diagram without answering the question and some descriptions were too vague. Otherwise some good explanations of the displacement process were seen.

2d) Many candidates compared properties instead of explaining the differences. A common mistake was to describe steel as a compound, which could lose candidates marks through the list principle, instead of as an alloy.

2ei) This was not answered very well with a number of candidates getting the correct formulae but because it wasn't balanced, losing the mark.

2eii) A significant number of candidates hadn't read the question properly and were referring to carbon dioxide and global warming. Otherwise it was generally answered well although again, some candidates' answers were too vague to get the mark.

Question 3

3a) Although some candidates only referred to carbon dioxide emissions omitting to include petrol usage as well, this question was mainly answered quite well.

3b) A number of candidates tried to do 221 x 0.6 with no idea of how to convert time units. This question was answered poorly by most of the candidates.

3ci) Conversion of units here was better and the question was answered well and was a good discriminator for mid-high ability.

3cii) This was very poorly answered. A common mistake was to convert the value of 8.8 km/h from the table into metres or to use the top speed of 206 in the question. Many candidates did not appear to realise the question was still asking them to use the data in the stem of 3(c).

Question 4

4ai) The majority of candidates answered this question successfully, although a few candidates do think fungi make mushrooms.

4aii) Most candidates wrote penicillin or antibiotics for the first mark but a large number mistakenly wrote that it was made by a bacteria.

4aiii) A number of candidates misread the question giving examples of why genetic engineering might be useful instead of how it was used. The question was not answered very well with other common mistakes being that candidates think it makes harmful bacteria harmless or giving explanations of selective breeding instead.

4bi) This question was answered well.

4bii) Many candidates were getting the first two marks and the third was a good discriminator. This was generally answered well although there were candidates who gave answers describing ideal characteristics required in meat, leather and wool.

Question 5

5a) The most common error was where candidates calculated that 50cm^3 of concentrated juice was needed for each serving and then forgot to add the volume for water. A surprising number could not convert 1litre into 1000cm^3.

5b) This was generally answered well. Common errors were candidates describing the use of preservatives in terms of adding to colour or taste. Fresh was not credited although it was a common response.

5ci) This was generally answered well, with the majority getting at least one mark.

5cii) Generally answered well, with most candidates getting at least one mark for mentioning liquid.

5di) Many got one mark for the solid being left behind but then didn't follow that through to say how that would affect the results. A common misconception appears to be that if the bottle had been shaken first, more particles would dissolve, which would make the mass lighter than if the particles were still dissolved.

5dii) Generally answered well with the link here being made between the error and an increased mass.

Question 6

6ai) Most candidates got marks for referring to fossil fuels being non-renewable and causing global warming but few were gained three marks. Several candidates were referring to cost, perhaps in response to energy costs being in the news but centres should be made aware that cost is normally ignored for these kinds of questions.

6aii) Most of the candidates who got one mark gained it by referring to unreliability, some getting the same bullet point in reference to the sun and the wind without mentioning anything different but otherwise a lot of answers were vague.

6bi) Many candidates were referring to the properties of propane in this answer (flammable). The importance of including the word only in this definition should be emphasised to centres because it was the biggest error in this answer.

6bii) This wasn't answered particularly well, considering it is a simple pattern to learn for higher candidates. There were a large number of references to it being a gas or being light. Most who got the mark got it for referring to the low boiling point.

6ci) Candidates are expected to know only the formulae listed in the specification but there were a lot of errors in this one, with many making complete guesses (M or Me). Very few of the candidates who did get it right lost a mark for a lower case h but this was still happening occasionally.

6cii) This was a good discriminator. The most common errors were candidates referring to there not being enough oxygen to breathe (not burn) or saying that the lack of oxygen would cause methane to explode.

Question 7

7ai/ii) The quality of lines of best fit and extrapolation of those lines was much better than seen in previous years. There were a surprising number of candidates who made plotting errors despite the scales seeming straightforward for a higher paper and there was some carelessness noted for the second part in writing the correct number of '0's' in the answer.

7b) Most were able to get at least one mark here. The most common error was in only referring to protection, which could be referring to contraceptives and some did give the pill as an option. Some candidates did refer to sharing dirty needles.

7c) A number of very good descriptions of the secondary response were seen but could not gain extra marks in the context of the question.

7d) A lot of confusion seems to be apparent between antibiotics and antibodies or reference was made to there being too many bacteria in the system for the antibiotics to cope with.

Question 8

8ai) Answered very poorly with few if any getting the mark. A significant number think that the fact that one ion is negative will make it's mass lighter but the majority were just making completely random guesses or just stating that NaCl was soluble.

8aii) This was a good discriminator where the most common error was to just write the name and formula of an ion instead of a compound.

8bi) This kind of question is still not being answered well. Many candidates were simply describing the process of boiling or the structure of liquids and gases, eg the particles are further apart.

8bii) A good discriminator, with most who got it right referring to a higher melting point or boiling point and only a few describing strong bonds. Many candidates do think that solids just will not melt that being the reason why ionic compounds are left behind.

8ci) This was generally answered well. Some were losing marks by eg referring to sulphates as sulphur.

8cii) This was surprisingly not answered as well as expected, as many hadn't read the question properly and were giving examples of fertiliser ions.

Question 9

9ai) Not many candidates are using the word conduction or describing conduction, although they seem to know about cavity wall insulation. There were a lot of very vague answers, such as insulate the wall or references to reducing heat by filling in cracks in the wall.

9aii) Here again there were a number of references to gaps in roofing tiles being the reason why heat escapes. Some good descriptions of convection were credited but too many heat rises instead of hot air rises seen.

9bi) This was answered well by the majority who attempted it, although some had clearly remembered the formula incorrectly.

9bii) A significant number didn't attempt this question. In some cases an answer close to but not in the acceptable range was seen, which could not be given any credit because no working had been shown.

9biii) This question was not answered well with many vague answers referring to wasted energy were seen or candidates just restating the question.

Mark Ranges and Award of Grades

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