A-level
Chemistry

CHEM1 Foundation Chemistry
Report on the Examination

2420
June 2015

Version: 1.0

Further copies of this Report are available from aqa.org.uk

General comments

The paper appeared to be a fair test of students' ability at AS level and there were some high performing answers that showed a deep understanding of the subject.
There is still evidence of a lack of legibility of students' responses due to very poor handwriting and/or the use of pens that do not allow the papers to be scanned well. The instructions regarding the use of a black pen are clearly stated and centres must ensure that all students follow the rubric on the front of the examination paper.

It was noted that the more mathematical questions were attempted by almost all students and that there were many students who performed well in these questions. However there are still some students who do not give answers to the required precision as stated in the question.
The standard of literacy is still an issue since many students often referred to 'it' in their answers and it was often unclear what they were referring to; hence the answer was often ambiguous and could not score marks.

There were many students who used additional sheets. This should be considered carefully since answers on the additional sheets often contradicted answers on the paper and hence no marks could be gained. Students must always cross out work that is not to be marked.

Question 1

The students who selected the correct element in part (a) generally went on to score full marks. However a large number thought that argon had the highest melting point and therefore did not score any marks. In part (b) the majority of students selected argon and gave an explanation of their choice. If the answer was correct the most common problem was missing the shielding factor necessary for the third mark. Part (c) was answered correctly by most students. The shape of ClF_3 was found easier to draw than CCl_2 in part (d)(i) and the name of the shape in (d)(ii) was answered correctly by many students. The most common error in part (d)(iii) was to write an equation to produce two moles rather than one mole as stated in the question.

Question 2

Students found part (a) tricky and many did not realise the significance of the [Kr] given; however some students answered very well and had all the sublevels in the correct order. Part (b)(i) was answered very well by most students. Common mistakes included failed attempts to express the data as percentages and not giving the answer to the required number of decimal places. There were many confused answers to part (d)(ii) and these included references to impurities and the size of the sample rather than the fact that the Periodic Table takes into account all isotopes whereas the sample didn't. The equation in part (c) was often given the wrong way round showing that students did not understand the process occurring at the detector; many students used Tl rather than Te in their equations. In part (e) the majority of students chose the correct answer and gave a good explanation of their choice. The most common error was choosing 130 and stating that it had the biggest value. Many students thought that the atomic radius of the two isotopes in part (f) was the same but did not then give a complete explanation; many only referred to the number of protons in the nucleus.

Question 3

The type of crystal structure was well answered in part (a) and many students correctly explained, in part (b), why silicon dioxide does not conduct electricity. In part (c) many students thought the other product was oxygen and there were several students who had the right products but then failed to balance the equation.

Question 4

The calculation in part (a) was well answered with many students scoring full marks. For those who did not score full marks there was a good attempt at the question with marks one and three being accessed by the majority of students. Several alternative methods that produced the correct answer were seen and these were all given full credit. There were many varied answers to part (b) that showed students did not understand what should be done in this practical situation. Many students suggested collecting the gas evolved (by various methods) and testing it to check that it was water.

Question 5

There were several different angles given in part (a) but the majority of students gave the correct one. The type of intermolecular force in part (b)(i) was very well answered. There were many students who scored full marks on the diagram in part (b)(ii) showing the lone pairs as lobes, two crosses or two dots. It should be stressed that students who choose to use dots should ensure that they are bold and clear. Some students however failed to score full marks since they did not have the correct number of lone pairs on each of the oxygen atoms. Partial charges, if seen, were generally correct. Several students did not read the question and used two water molecules instead of what was required. Answers to part (c) were generally quite poor and showed that students did not really understand the concept of electronegativity; many tried to compare the electronegativity of molecules rather than atoms. The students who correctly stated that the electronegativity of sulphur was lower than oxygen could often not explain the relevance of electronegativity difference to hydrogen bonding being absent between the molecules.

Question 6

Most students gave correct answers for part (a) although there were still some who did not state that *only* carbon and hydrogen are present in a hydrocarbon. The equation in part (b) was generally correct although some did have carbon dioxide as one of the two products. In part (c) the majority of students scored the first mark but some just stated that sulfur dioxide was toxic and failed to mention acid rain. A few students suggested that the sulfur compounds themselves escaped into the atmosphere without any mention of combustion. The equation in part (d)(i) was well done; the most common error was having the correct products but then failing to balance the equation. Answers to part (d)(ii) were poor with relatively few stating a correct substance made. Part (d)(iii) was answered by a majority of students; the most common error was to draw propene rather than the functional group isomer. The structure in part (c) was also well done by the majority of students, although some students left out a hydrogen atom from the chain and could not score the mark.

Question 7

The correct answer to the calculation in part (a) was seen regularly, but there were some students who made an attempt at it, gained two or three marks, and then could not complete the calculation. The most common errors were either to ignore the factor of 2 from the equation or multiply by 78 rather than 39. The calculation in part (b) was attempted by almost all students resulting in the full range of marks. The first three marks were regularly seen in students' answers but often this was followed by a failure to multiply by the correct factor from the equation. It was disappointing to note that there were still some students who could not rearrange the ideal gas equation correctly. In part (c)(i) many students did not score full marks since they could not convert volume into dm^3 and therefore could not give the concentration in mol dm^{-3} as asked for in the question. Many students could not balance the equation in part (c)(ii). Part (d) was well answered although there were some students who thought the azide ion was N^{3-} rather than N_3^-. The arrow in part (e)(i) was rarely in the right place and it was disappointing to note how many did not use an arrowhead on one of the bonds shown as specified in the question. Part (e)(ii) was not well answered with many students suggesting species that were not molecules; Ti was a common incorrect answer. The whole range of answers was seen in part (e)(iii) but many students were able to identify the correct formula.

Mark Ranges and Award of Grades

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

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator www.aqa.org.uk/umsconversion