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Examiners' Report/ Principal Examiner Feedback

Summer 2013

International GCSE
Chemistry (4CH0) Paper 1C
Science Double Award (4SC0)
Paper 1C

Edexcel Level 1/Level 2 Certificate
Chemistry (KCH0) Paper 1C
Science (Double Award) (KSC0)
Paper 1C

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Summer 2013
Publications Code UG035592

4CH0 1C June 2013 Report

Question 1
This was a straightforward question about atomic structure. As expected, the vast majority of students scored full, or nearly full, marks. There was some confusion in part (a) between atomic number and mass number, while in (b) a handful of answers gave numbers instead of choosing the words from the box.

Question 2
This question on hydrogen and water was well answered by most students. In part (b), although most scored the mark, it was disappointing to find errors in this most familiar of gas tests. Quite a few failed to describe the splint or spill as lit or burning, while others described it as glowing. The equation in (c) was usually correctly balanced (often with an unnecessary coefficient of 1 before O_2), but some students wrote 1 very much like a 2 (with a diagonal line at the top and a horizontal line at the base) - students should be aware that with ambiguities of this type, the benefit of doubt is not given. It was pleasing to see many correct answers to the final and most open-ended part (d)(ii) of the question.

Question 3
Part (a) was usually answered correctly, but (b) proved more of a challenge for students, the fundamental error being to confuse halogens with halides. In (b)(i), a common answer was that lithium chloride solution already contains chlorine, whereas the idea of no possible reaction was what was needed. In (b)(ii), several answers stated that iodine did not react with sodium, and in (b)(iii) the brown colour was sometimes associated with potassium chloride. The equation in (b)(v) saw a great variety of errors, with perhaps 2Br instead of Br_2 being the commonest.

Question 4
Part (a) of this question about ethene proved a challenge for many students. A disappointing number of students did not show the correct numbers of carbon and hydrogen atoms, with attempts at methane and ethane being quite common. For those who did not make this mistake, the commonest error was to show only two electrons between the carbon atoms (and then unpaired electrons), with relatively few showing only one electron shared between the C and H atoms. In (b), it was pleasing to see many all correct answers, although there is still a hard core of students who divide by atomic numbers or do the division upside down. For those who succeeded with (b)(i), the commonest error in (b)(ii) was to write $2CH_3O$ or $(CH_3O)_2$.

Question 5
This wide-ranging question on the extraction of metals showed many examples of lack of knowledge and understanding. The question was deliberately set as a comparison of the extractions of iron and aluminium, but many students were confused by this. In part (a) it was disappointing to see AlO given as the formula of aluminium oxide, while in (iii) and (iv) many of the answers to the elements asked for were compounds. Lack of

precision in wording caused many to lose the mark in (b)(ii), especially answers such as "aluminium gains electrons"; students should be aware that this answer is very different from "aluminium ions gain electrons". The explanation tested in part (c)(ii) still causes problems for many students. The point made in several previous examiner reports, that cryolite does not lower the melting point of aluminium oxide (or worse, the boiling point of aluminium oxide or the melting point of aluminium), is still not known by many students. In (d)(iii), the expected "slag" was often replaced by "limestone".

Question 6

This question on fundamental organic chemistry was well attempted by most students. Many scored full, or almost full, marks in part (b), with the commonest error being in (ii), where the meaning of "saturated" was sometimes given. In (b)(iii), there were many answers that referred to isomers having just "the same formula", which is not precise enough to score the mark. In (c), there are still many examples of physical properties being described as similar, rather than showing a trend. Part (d) proved more of a challenge, with many examples in (i) containing two bromines joined to the same carbon atom, while in (ii) many answers showed the correct formula of bromomethane or only one C and three H atoms.

Question 7

Many students had a lot of success with this question on energetics, although a lot seemed to overlook the fact that the reaction considered was endothermic - there seemed to be an assumption that all reactions studied in the topic of energetics were exothermic. The point tested in part (a) was generally well understood, but the commonest error was to refer the curve not reaching 0°C or the *x*-axis. In (c)(ii) a surprising number of students gave both exothermic and endothermic as answers. Many answers to (d) failed to score; several students did not seem familiar with the idea of showing the products on a horizontal line (and many of those who did represented the reaction as exothermic), while the energy change was often carelessly represented, with the ΔH symbol not being shown clearly as a vertical distance. Many calculations in (e)(i) were correct, although the missing piece of information was rarely correct (often the M_r of ethanoic acid or the mass of baking soda were seen).

Question 8

This question on rates of reaction was well attempted by most students. The main problem in (a) was quoting properties of hydrochloric acid, or giving surface area and size as separate points. Part (b) was well answered, with only a few errors, such as the names of the gas (student 4) and the acid (student 5). Many students lost a mark in (c)(i) through omitting the point for 70%, while some drew a line that was not of best fit; a few lost a mark through not using a ruler. Relatively few marks were scored in (c)(iii) - questions of this type always require a specific direction for the error, so to state that the acid concentration might have been too high is fine, but not just that the acid concentration might have been wrong.

Question 9

Most students were able to name the most appropriate pieces of apparatus in parts (a)(i) and (ii), but were much less successful with the explanations in the unfamiliar parts (iii) and (iv). It was probably more of a failure to choose the right words than giving completely wrong answers. Most chose a suitable indicator in (iii), with only a few examples of iodine and litmus paper appearing. Part (b) will have been familiar to students who have looked at past papers, but responses were noticeably worse than in previous sessions, with many reading the scales the wrong way up (3.25 and 23.40 were depressingly common). Again the instruction to enter values to the nearest 0.05 cm^3 appeared in the question paper, and again it was ignored by many. In (c), a disappointing number of students failed to choose the concordant results, even though concordancy was defined in the question. Part (d) tested understanding of calculation methods in an unfamiliar way, but a pleasing number of correct answers were seen.

Question 10

Answers to parts (b) and (c) were disappointing, with many students not using the correct wording for an equilibrium shift (such as "the equilibrium increases"), in addition to those who made the wrong prediction. Many seemed reluctant to state "increased" twice in (c). The calculation in (d) was generally well attempted, with the commonest error being the failure to convert the mass into grams in (i). Consequential marking was applied, so this error lost students only one of the five available marks.

Question 11

Questions on bonding and structure continue to be a major problem for many students, with many marks lost through the use of incorrect terms. Examples included the movement of ions in (a)(i) and the movement of protons in (a)(ii). In (b), many examples of breaking covalent bonds (or the bonds between atoms) in nitrogen were seen, while in silica many students referred to the breaking of ionic bonds or the overcoming of intermolecular forces.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

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