Examiners' Report/
Principal Examiner Feedback

January 2014

Pearson Edexcel International GCSE in Chemistry (4CH0) Paper 2C

Edexcel Level 1/Level 2 Certificates Chemistry (KCH0) Paper 2C

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4CH0 & KCH0 (2C) Principal Examiners' Report – January 2014

Question 1

This was a fairly straightforward question about the structure of atoms, in which the majority of candidates scored high marks. There were, however, some errors, including distractor D in both (a) and (b). Most marks were lost in (d), where many candidates referred only to atomic number and mass number, without using the information from the table about the numbers of sub-atomic particles demanded by the question.

Question 2

This question on halogens proved challenging for most candidates, with many errors seen in most parts. In part (a), fluorine and chlorine were both included as halogens with the darkest colours. A surprising number of candidates could not provide the correct names for HCl(g) and HCl(aq) in part (b)(i); common errors included "hydrochloride" for HCl(g) and "hydrochloric" (without the "acid") for HCl(aq). In (b)(ii), most realised that ammonium chloride was formed, but gave an incomplete or inaccurate observation - for example, omitting "white" and using the terms "fumes" or "precipitate". Some referred to the use of an indicator to test for either NH_3 or HCl. It was disappointing to see so many incorrect state symbols in (b)(iii), especially as silver nitrate was described as a solution in the question; although (aq) and (l) are often confused, it was surprising to see HNO_3(g) in answers. Parts (c)(i) and (ii) were better answered, with few failing to identify hydrogen as the source of the bubbles; the commonest wrong answer in (c)(ii) was to describe the magnesium as changing colour, usually to white or black. Most realised that the colour change in (c)(iii) was due to the presence of acid, but in (c)(iv) many thought that the lack of colour change was due to the formation of an alkali.

Question 3

The unfamiliarity of tungsten did not seem to affect candidates' success in this question. Part (a) was well answered (although with tungsten(III) oxide as the commonest wrong answer), while the empirical formula calculation in (b) saw no more than the usual number of errors - doing the division the wrong way round, using atomic numbers in place of atomic masses, and inappropriate rounding of the mole ratio, leading to answers such as $CaWO_3$ and $CaWO_5$. Although many all-correct calculations were seen in (c), it is apparent that some candidates are unfamiliar with reacting mass and percentage yield calculations; in (c)(i) many were able to calculate the amount in moles, while in (c)(ii) the division was often inverted, giving an answer greater than 100%.

Question 4

This question about temperature changes in a neutralisation reaction provided many opportunities for candidates to demonstrate their understanding of a practical procedure. Most were successful in identifying at least one of the properties to be kept constant in part (a), although volume was often given. The ability to record a thermometer reading has been regularly tested in this specification, so it was disappointing to find so many errors in part (b); those who added the intermediate values to the diagram (16, 17 etc) tended to make fewer errors in their answers. The multiple choice questions in part (c) were challenging, and few candidates got both correct. Although there were many graphs that scored full marks in (d), some candidates struggled to score marks here. The addition of intermediate values to the axes might have avoided some plotting errors. Candidates should be aware that the use of a ruler to draw a best-fit straight line is expected. The commonest error was drawing the first line to include the fifth point, rather than through the first four points, as instructed in the question. The readings from the graph in part (e) were often correct, but candidates should be aware that an integer value, such as 19, should be recorded as 19.0 (note that all integer values in the table were recorded in this way, as were the values on the axes of the graph). Mole calculations like those in part (f) should be familiar to candidates who have looked at past papers, and there were many all-correct answers, but few blanks, seen. The commonest errors seen in otherwise correct answers were the failure to use 1000 in either or both of (i) and (iii), and to use the mole ratio the wrong way round in (ii).

Question 5

Candidates had mixed success in this question about organic chemistry. In (a), responses A and D were popular choices. In part (b), a minority of candidates misread the question and attempted to describe the process of fractional distillation, or sometimes cracking. For the most part scores of 2 and 3 were more frequent than 0 or 1 mark, although a surprising number stated that kerosene was more viscous than crude oil. Candidates should be aware that in a question of this type, about differences, comparisons are required, so, for example, it is insufficient to state that that the molecules in crude oil are large, without also making a statement about kerosene (of course, to state that they are larger is also a way of making the comparison). The formulae and name in part (c) were frequently correct, although C_7H_{16} was a common wrong answer in (c)(i), and many displayed formulae for ethene lacked a C=C double bond. The repeat unit in part (d) was more problematic, with some errors in atoms seen (Cl_2 in place of Cl, or two Cl atoms instead of one), but missing or incorrect bonds were more common (C=C or lack of continuation bonds). In (e), many candidates were able to distinguish between the two types of polymerisation, either by referring to the formation of a small molecule or to the number of different monomers involved. Those who did not know the difference usually guessed along arithmetical lines (addition makes larger polymers, condensation makes smaller polymers). The meaning of the term "biodegrade" was not well explained, with many using the term "degrade" in place of an alternative such as "break down" or "decompose", and omitting a reference to micro-organisms or an equivalent, or even a reference to biological or natural methods. A significant number misread the question and gave reasons why polymers do not biodegrade. The expected answer to the final part was a reference to inertness (as in the specification) or equivalent, but most answers referred to the strength of bonds.

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