GCE
Chemistry

CHEM1 – Foundation Chemistry
Report on the Examination

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General Comments

Students were able to access all of the marks on the paper and there were no 'dead' marks. Students of all abilities were able to display their knowledge and understanding in many questions and there were some questions designed to challenge the most able students.

It was disappointing that fundamental knowledge of formula was often incorrect eg nitrogen and chlorine gases were often given as Cl or N rather than the correct Cl_2 and N_2

There continues to be a lack of understanding over the difference between decimal places and significant figures in the mathematical answers given.

Once again, handwriting was often very small or very faint introducing the possibility of ambiguity. It appeared that there were still many students who did not use a black pen as instructed in the rubric on the front of the paper.

Students should be reminded to cross out work that has been replaced so that contradictions between answers are not seen. Often answers not crossed out on the script were contradicted by answers given on additional sheets and caused marks to be lost.

Question 1

The definition in part (a) is still not well known. Average or mean was often omitted as was mass. Part (b) was well done although a few students still chose to divide by 100. In part (c), the charge on the ion was often missed out. The most common wrong answer in part (d) was 74 since students were obviously confusing deflection with detection. The majority who chose 70 carried on to give the correct explanation. Answers to part (e) were poor with many students not referring to electrons at all. Most students scored the mark in part (f).

Question 2

Most students answered part (a) well although there were a few who omitted the key word 'molecular' in molecular formula. Most students could give the correct IUPAC name in part (a)(ii) but the name in part (a)(iii) was more problematic. Part (a)(iv) was reasonably well done although some students showed a cyclobutane structure without showing the displayed formula as asked for in the question. The solid product in part (b)(i) was often given as CO or CO_2 and hence the mark for the hazard could not be scored in part (b)(ii). Many those who correctly gave C as the product, simply stated that it was a pollutant without further qualification. Part (c)(i) was answered well as was part(c)(ii). Common incorrect answers to part (c)(ii) were bitumen and plastics. The equation in part (d)(i) was generally answered well although again there were a lot of students who gave the formula of nitrogen gas as N. The catalyst in part (d)(ii) was usually correct with the most common answer being platinum.

Question 3

Part (a) was answered well although a few students lost the mark by simply stating 'giant' or 'giant lattice'. Generally, students did well in part (b), although some forgot to mention a pair or two electrons being shared. Most students scored the mark in part (c) but could not work out the correct empirical formula in part (d).

Question 4

Most students could state the correct intermolecular force in part (a). In part (b), although many students scored all three marks there were many diagrams that were difficult to read since they were too small or very faint. Marks were lost by not giving the correct number of lone pairs or omitting the partial charges. In part (c), many students did not relate solubility to interaction between phosphine and water. It also appeared that a few students think that there is hydrogen bonding between P and H in the phosphine molecule.

Question 5

The equation in part (a) was given correctly by only a few students. Far too many students could not give the correct formula for aluminium chloride. The type of bonding in part (b) was well answered but many students thought that the pair of electrons originated from the Cl atom or from the Al atom. In part (e), the majority of students gave a correct structure and formula. Incorrect answers were due to the insertion of lone pairs of electrons. The linear shape in part (f) was generally answered well but the explanation of the shape often did not refer to repulsion between the bonding electron pairs. The majority of students scored the mark in part (g), realising that the outer electrons are removed first during successive ionisations.

Question 6

Part (a) was answered well by the majority of students. However, a few students were confused by periods and groups and referred to 'going across the group'. The explanation was generally good but the second explanation mark about shielding was sometimes omitted. In part (b), the first two marks were well done but the explanation was often ambiguous with students stating that electrons repelled without stating which electrons they were referring to. The equation in part (c) was answered well although some students lost marks since it was unclear whether their state symbol was 's' or 'g'. Answers to part (d) were mixed. Many students thought that the electron is removed from the positive nucleus and did not realise why the second ionisation energy is higher. Various answers to part (e) were seen with neon being a common incorrect answer.

Question 7

Some students found no difficulty with the three numerical parts of this question. However, this question proved challenging for many students who often gave a jumble of figures with little explanation of where they came from.

Part (a) was the most well answered of the calculations although a small number could not score the first mark. In part (b), most students scored the mark for the number of moles of HCl. However, many students then used 0.083 in their answer and did not realise that the HCl was the limiting reagent. Many added the moles of HCl to the moles of pure zinc oxide whilst others multiplied the moles of HCl by 2 rather than dividing.

Answers to part (c) used various methods with many scoring the first two marks of the alternative method shown in the mark scheme. It should be noted that if an answer requires 3 significant figures, then the calculation should use at least 3 significant figures throughout. If less than this is used and then the answer is given as 3 'significant' figures, this will have introduced error and the final answer will not be within the margin of tolerance allowed. The bonding in part (d) was answered well by the majority of students.

Question 8

The name in part (a) was generally answered well but the general formula proved more difficult. In the explanation, it was not always clear that the van der Waals' forces were between the molecules. Part (b) was answered well by the majority of students. The main error was including CH_3 in the displayed formula and quoting the molecular formula rather than calculating the empirical 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 http://www.aqa.org.uk/exams-administration/about-results/uniform-mark-scale/convert-marks-to-ums