



General Certificate of Education

Chemistry 1421

CHEM1 Foundation Chemistry

Report on the Examination

2010 examination - June series

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General Comments

Candidates should be encouraged to write clearly and legibly. There was much evidence of candidates not following the rubric of using a black pen. Mathematical aspects of the paper were generally attempted well but there were many candidates who did not know the difference between decimal places and significant figures.

Writing balanced equations continues to be an area that needs much development and practice by the candidates.

Question 1

In part (a)(i) many candidates omitted the word 'pair' from their answer and hence did not score the mark. The equation in part (a)(ii) was not answered well since many candidates failed to read the question, which asked for an equation to produce one mole of product. Other errors included not giving the correct formulae for chlorine or fluorine molecules. Candidates found the first structure in part (b) relatively easy, but answers for the structure of ClF_3 often included the wrong number of lone pairs of electrons. Part (c) was answered well. The idea of co-ordinate bonding was generally well known but the explanation in part (d)(i) was not. Many candidates thought that the lone pair originated from the B rather than the F^- . A large range of answers was seen in part (d)(ii) with 107.5 being the most popular incorrect answer. If candidates understood the concept of atom economy then they generally scored 2 marks in part (e).

Question 2

Part (a) was answered well. The equation in part (b) was generally well known although many candidates lost the second mark for omitting the state symbols or having the electron on the wrong side of the equation. Part (c) was answered correctly by a good number of candidates. The explanation in part (d) was variable with much confusion over paired electrons and lone pairs of electrons. There was much inaccuracy in the use of terminology in candidates' answers. Answers to part (e) were variable and answers included almost every element in period 2. Part (f) was well done by a majority of candidates.

Question 3

Part (a)(i) was done well but the 5/2 ratio in part (a)(ii) proved very difficult for many candidates. The calculation in part (b) was attempted well but the conversion into cubic decimetres proved challenging for a large number of candidates. Part (c)(i) was answered well but part (c)(ii) was less well answered.

Question 4

In the empirical formula calculation in part (a) most candidates arrived at the 1.85 :4.63 ratio but a surprising number of candidates could not convert this into 1:2.5 and then into N_2O_5 . In part (b) a large majority of candidates scored the mark although some thought that NO dissolved directly in rain to make acid rain. Part (c) was generally answered well. In part (d) there was much confusion as to where the nitrogen had come from. The most common error was to state

that it came from the fuel. In part (e) equations often contained 2N atoms rather than the nitrogen molecule.

Question 5

The equation in part (a) was answered well by the majority of candidates with the most common error being the wrong number of oxygen molecules. The condition in (a)(ii) was generally well known. The answers to part (b) were very variable. A large number of candidates could identify the gas but very few scored the mark in part (b)(ii). The idea of larger surface area in part (b)(iii) was well known.

Question 6

The idea of boiling point was generally well known although a few stated melting point as being the property in part (a). The definition in (b)(i) was well done with only a few missing the idea of isomers having the same molecular formula. The name in (b)(ii) proved difficult for a large number of candidates and the idea of cyclic alkanes in (b)(iii) was only achieved by the most able candidates. Part (c) was answered reasonably well although many candidates thought that the ethene itself was used as a plastic rather than being used to make plastics.

Question 7

Answers to part (a) were variable. Many candidates thought that graphite was metallic rather than macromolecular and many did not refer to iodine as being molecular. In part (b) answers were often muddled. Some candidates thought that the layers in graphite were held together by electrostatic forces between positively charged layers and delocalised electrons. Some thought graphite contained hydrogen bonding rather than van der Waals forces. This question was simply recall of knowledge and it was surprising how many candidates could not answer it correctly. The answers to part (c) often contained reference to covalent bonds being broken. Part (d) was generally answered well.

Question 8

Answers to part (a) were generally well done by a large number of candidates. However the definition of mass number was often confused with relative atomic mass and a surprising number did not state the correct numbers of protons, neutrons and electrons. Answers to the definition in part (b) were variable as always. The most common errors were to miss out the word average/mean on the top line and 1 atom on the bottom line. The calculation was attempted well although some candidates did not give their answer to 2 decimal places. Part (c) was generally well answered. Part (d) answers were varied. Some candidates thought that natural and synthetic compounds would react differently and the ones who knew the reactions were identical often failed to qualify their answer sufficiently well to gain full marks.