



**General Certificate of Education (A-level)
January 2013**

Chemistry

CHEM2

(Specification 2420)

Unit 2: Chemistry in Action

Report on the Examination

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General

This paper was very accessible and high scoring with full marks seen on every question. Thinking through the answers to questions with novel approaches to ideas on the specification continues to prove to be quite demanding for some.

Question 1

In part (a)(i), many students were unable to state that the rate is zero at point W. There were many qualitative answers to part (a)(iii) even though the word “double” is used twice in the question. In part (b), students often failed to label their reaction profile with sufficient clarity and only 45% scored both marks.

Question 2

This question was high scoring. In part (b)(i), almost 48% scored full marks and for those who did not, it was the idea that catalysts alter the rate of a reaction and are chemically unchanged at the end of the reaction that was missed most often.

Question 3

The calculation in part (a)(i) was high scoring with 72% gaining full marks and incorrect answers from the remainder due either to simple arithmetic errors or to chemical errors. In parts (b) and (c), incorrect chemical formulae were relatively common.

Question 4

Almost 85% of students were able to give a correct statement for Hess’s Law and then attempted to apply it in parts (b) and (c), with over 70% success. No credit was given for a value calculated in part (c), consequent on an incorrect expression in part (b), since that is a chemical error.

Part (d) was generally well-answered although the negative sign was often missed in the answer leading to only 35% gaining all three marks. Only 7% were able to deduce a correct answer to part (e).

Question 5

Many very good answers were seen throughout this question. In part (b), only 32% scored full marks because too many students repeated information from the question and missed the opportunity to score marks for conditions. In part (c), the displayed formula for a carboxylic acid requires the O–H bond drawn out and 62% of the students gained this mark. Some very good work was seen for the half-equations in parts (c)(ii) and (c)(iii). Part (d) was answered quite well.

Question 6

The formula for ammonia and that for nitrogen caused the most problems in part (a) and only 60% scored the mark. The definition of mean bond enthalpy has not been examined for some time and the idea that it is a measure of the enthalpy change when a **covalent** bond is broken was missed by most, although many knew that the mean value comes from an average of the values obtained for the same bond in a range of different compounds. In part (c), 51% of students scored full marks, however, many students made transposition and arithmetic errors.

Question 7

Part (a)(ii) of this question discriminated extremely well, although the termination step caused problems for those who were determined to produce difluoromethane. Phonetic spelling was allowed in part (b), but other incorrect spelling, such as “flouro”, was penalised. Students were required to cancel through any additional species on both sides of the equation for credit to be awarded in part (c)(i) and 51% scored this mark. Only one answer was acceptable for the more demanding part (c)(ii) and 18% were successful.

Question 8

Organic reaction mechanisms discriminate well. Schools and colleges still need to heed the advice given in the June 2011 report that full marks will only be awarded in a mechanism such as that in part (b) if the positive charge on the intermediate alkylammonium ion is placed on the N atom and not on or adjacent to a hydrogen atom. Over 80% scored at least 3 marks on both parts (a) and (b). A surprising number of students were unable to name substance X correctly in part (c).

Question 9

This question discriminated well with 52% gaining at least 3 marks and most students recording observations associated with the reaction (required by the question), rather than from other reactions that may be occurring at the same time. The remainder of the question was answered well although some were confused about what was happening to iodide ions in terms of electrons.

Question 10

The chemistry of Group 7 is never answered particularly well. This question was no exception and errors were seen both in the equations and in the observations and explanations. Part (a) was the least well-answered with only 13% gaining both marks. Even in part (d), only 75% of the students gained any of the 3 marks. Students need to be advised to learn the key information from this area of the specification and then to read the full question with care in every case.

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