



**General Certificate of Education**

**Chemistry 5421**

**CHM3/W Introduction to Organic  
Chemistry**

**Report on the Examination**

*2009 examination - January series*

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## General Comments

This paper was marked on-screen by CMI+ and most candidates answered the questions on the specified pages.

The structure of the paper and the scheme of marking ensured accessibility for all candidates. All marks on the paper were scored and full marks were seen. This is a legacy paper and most of the entry was from re-sit candidates with very few weak scripts seen. The usual errors of inaccurate names or structures, incorrect equations and poorly expressed definitions were seen, but the quality of organic reaction mechanisms was frequently good. Centres should continue to encourage candidates to draw clear structures, to express their thoughts using sentences and to use appropriate chemical terminology.

## SECTION A

### Question 1

More than half of the candidates scored full marks on every part of this question and were not put off by the ring structures. Part (c) proved to be the least well answered part.

### Question 2

Parts of this question were relatively high scoring and it was particularly pleasing to see as many as 80% of the candidates scoring 4 or more marks on the mechanism in part (b). In part (c) (ii), candidates were required to focus on the minor product and to appreciate that it forms from a primary carbocation. This was a low scoring part of the question with only about 40% of the candidates able to write meaningful statements which addressed the question asked. In part (d) (iv), some candidates stated incorrectly that the reason for the resistance to oxidation was due to carbon-carbon single bonds being too strong, despite the fact that they are the weakest bonds present in the molecule.

### Question 3

The relatively straightforward empirical formula and functional groups in the glucose structure proved difficult for a large number of candidates to identify with almost 40% failing to obtain full marks for what should have been a very straightforward introduction to the question. By contrast, writing a correct equation for fermentation was done well, despite having caused problems in previous papers.

### Question 4

This was a demanding question and while almost 65% of the candidates could score at least 4 marks for the mechanism in part (a), the name and structure in part (b) caused problems for many.

### Question 5

This question proved to be relatively straightforward and it is clear that there have been big improvements since the early days of this paper when elimination mechanisms were done badly

by many candidates. The definition of stereoisomers caused the usual problems of candidates having some difficulty in expressing their ideas with clarity.

## **SECTION B**

### ***Question 6***

Despite part (a) being almost a direct re-run of the question set in June 2008, only 50% of the candidates were able to score 4 or more marks out of 5. In part (b) candidates needed to indicate clearly that incomplete combustion leads to the formation of CO but that a high temperature spark enables NO to be formed. Scores in part (b) tended to be relatively low, although many candidates scored some marks for their equations.

Part (c) was well known with more than 65% of the candidates able to score 4 or more marks out of 5. Vague answers about value-added were not acceptable for the industrial importance of alkene production.