GCE

Chemistry

CHEM2 – Chemistry in Action
Report on the Examination

2420
June 2013

Version: 1.0

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General comments

This paper proved to be more demanding than the June 2012 paper, with a mean mark of 56 in June 2013 compared to a mean mark of 60 in June 2012. The discrimination, indicated by the standard deviation, was slightly better. Notwithstanding the overall demand, full marks were seen on all questions.

Question 1

Students were able to produce high scores on parts (a)(i) and (a)(ii) with almost half of students scoring full marks in each part. However, parts (b) and (c) were answered less well with only approximately one-third of students gaining full marks in part (c). The mechanism in part (d)(i) discriminated well with the majority of students scoring at least three marks and a quarter scoring all five marks.

Question 2

This type of question demands that students have a good grasp of observational chemistry from the specification. No marks can be awarded in any of the four parts if a suitable test reagent is not known. This limited the marks for some students. No marks are awarded in the observation sections if the response is "nothing" or "no observation". The least well answered part was part (b) with just over half of all students scoring no marks and only approximately a quarter scoring full marks, By contrast the best answered part was part (d) with only very few students scoring no marks and almost two-thirds of all students scoring full marks.

Question 3

Over two-thirds of students gained at least 2 of the 3 marks in part (a). The commonest error was a failure to mark E_{mp} **on the appropriate axis** as required in the question. In part (b), it was important to specify that at a lower temperature there would be fewer successful collisions **in a given time**. This requirement meant that fewer than 10% of students achieved full marks for this part of the question.

Question 4

The balancing in part (a)(i) proved demanding and only approximately 60% scored this mark. The oxidation states in part (a)(ii) were high scoring with the vast majority of students gaining two marks. However, the construction of redox equations in parts (a)(iii) and (a)(iv) were of much higher demand and only 28% and 21%, respectively, gained these marks.

Few students scored full marks in part (b) despite its more open-ended approach to this topic. The question required recognition that this was about the use of scrap iron, but one mark was possible even for those students who chose an expensive method such as electrolysis.

Question 5

Mechanisms continue to discriminate well and over two-thirds of all students scored at least two marks in part (a)(i). Two displayed formulas were required in this question in parts (a)(ii) and (b)(i) and 37% and 25%, respectively, scored the mark in each part. Part (b)(ii) was relatively demanding, whereas the remainder of part (b) was very high-scoring.

Question 6

As with a number of other equations on the paper, rather too many of those given in parts (a)(i) and (b) were unbalanced. The observation in part (a)(ii) was answered well and over 80% of all students scored at least one mark in part (c).

Question 7

The free-radical substitution mechanism always discriminates well and this was no exception. Almost three-quarters of all students scored 2 marks but fewer than 10% scored 4 marks. It was important in the termination step to show clearly that the product is 1,2-dichloroethane.

Some good responses were seen in part (b) perhaps because this is straight from the specification, although only half of all students scored both marks in part (b)(ii).

Question 8

Overall, this question proved accessible for many students with part (c) the highest scoring part. Many students are being very sensible choosing to draw displayed formulae in questions of this type. The use of displayed formulae is to be encouraged since these gain full credit and often result in the student making fewer mistakes. Schools and colleges need to advise students to be careful about their working. If, in the answer space, they leave additional, incomplete or incorrect formulae that are not crossed through, this will contradict a correct answer which will then be penalised.

Question 9

This was a straightforward question but care was needed in presenting structures. It has been a feature of the general guidance for many years that we are lenient with C–H_3C (for C–CH_3) but not with C–HO (for C–OH) and not with C–NC (for C–CN). This question was no exception. As a consequence, some marks were lost in parts (a)(i) and (b) by poorly presented structures. In part (b) the structure of the repeating unit was required and answers which included “n” were not accepted as these answers indicated the structure of the polymer.

Infrared spectroscopy questions are high scoring and in almost a third of all students scored both marks in part (b).

Question 10

In part (a)(i), some students missed either the fact that the catalyst has to be a concentrated strong acid or that the unreacted ethene is re-circulated to achieve an overall yield of 95% and this meant that only a small number of students scored both marks. Considerable latitude was allowed in the responses for part (a)(ii), since it was clear that many students did not really understand what was happening in this process and this approach to the marking enabled the majority of students to gain at least two marks out of three. In part (a)(iii), some students recognised the possibility of poly(ethene) being formed and approximately 17% of students gained both marks.

It has been a while since a question like part (b) has been asked and it was not well answered with few students gaining full marks and over half scoring zero. Balancing the correct equation and then including the correct state symbols were both needed for full marks. Parts (c) and (d) proved straightforward for many and full marks were seen from over a third of students in each of parts (c)(i) and (c)(ii), respectively.

Question 11

The whole of this question was relatively straightforward and it was pleasing to see the majority of students gain at least 3 marks in part (a) and over 40% gain both marks in part (b).

In part (c), too many students failed to balance their equations or could not write the correct formula for magnesium hydroxide. Fewer than half of all students gained all three marks.

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