

A report on the 2004 Chemistry Olympiad paper

This year's Olympiad paper was probably the most original yet, and although there were two very challenging organic questions, the performance of many students was very encouraging. With the demise of **STEP** and **S** level papers, many teachers are using the Olympiad paper to stretch their most able students. The (mainly) complimentary letters from Chemistry teachers over recent years confirm that many students do enjoy the challenge presented by this paper. For our part, we set out to include questions that are relevant to the world we live in and try to avoid questions that can be answered by rote learning. It was particularly pleasing that many students (of all abilities) performed well on those questions that involved unfamiliar concepts, but where background information was provided.

Question 1 certainly did not fit the 'unfamiliar' category. Nevertheless, it was found challenging by a large number of students and, overall, the performance was disappointing. This may, in part, reflect the considerable reduction in redox chemistry at A level, and to the fact that some schools leave this topic to the end of the course. A worrying number of students represented high oxidation states of oxyanions of manganese, chromium and sulfur by Mn^{7+} , Cr^{6+} and S^{6+} respectively in the half-equations.

Many students answered Question 2 very well, although only a handful could write the correct equation for the reaction between carbonic acid and calcium carbonate. It would appear that hard water, if covered at GCSE, was just a distant memory!

The equations required in Question 3 defeated many students, and relatively few knew the formula for the nitrate(III) ion. The titrimetric calculation was done well by the better students.

'Agent Orange' (Question 4) presented a big challenge for all students, with only the very best able to achieve high marks. Many students were unfamiliar with the organic chemistry involved, whilst the answers to the NMR question showed how poorly this technique is understood by many students. Perhaps this reflects the rather limited way in which this topic is covered at A2.

Question 5 showed that many students can achieve high marks in a question where the concepts are unfamiliar, as long as sufficient help is provided in the question. We were similarly very pleased with the way many students attempted Question 6 which involved energy levels in a hydrogen atom. In fact, this question was the surprise of the paper, with a large number of high-quality answers.

The final question ('Asparagus-pee') was the most challenging, partly because of the inherent difficulty of the organic reactions, but also because some students probably saw it as the 'last straw'. We agree with the comments made by some teachers that the two organic questions were considerably more difficult than the physical/inorganic questions. They were, however, the two best-differentiating questions.

Overall, the committee were very pleased with the response of both schools and students to this year's paper. The statistics show that just over 300 schools registered to take part in Round I this year, a 14% increase on 2003. We received over 800 scripts, an increase of 27% on 2003. However, a significant number of schools (25%) did not return any scripts. We are keen to encourage schools to acquire Olympiad papers, but we hope more schools will register and send in completed scripts next year. The top mark was a remarkable 64 (out of a maximum of 66), whilst ten other students achieved exceptional scores in excess of 50. These were outstanding performances by any standards, and it is encouraging to report that just over 25% of returned scripts scored half marks or better. The top fifty students thoroughly deserved their £15 book tokens. Clearly many students found the paper very challenging, with some students struggling to get into double figures, but credit must go to all those who took part, whatever the score achieved. We hope that 2005 will see a further increase in the both number of schools and students entering.