A-level
CHEMISTRY

CHM3T Investigative and Practical Skills in AS Chemistry (ISA)
Report on the Examination

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General Comments

As this is the last occasion on which ISAs will be offered the comments below are meant to allow schools to reflect on this session but there is a need to be aware of the new arrangements for practical Chemistry that started with the new AS specification this year. The majority of scripts seen by moderators were those from repeat students whose main focus would have been the A2 units, ISAs and EMPAs. Consequently many fewer scripts were seen at the lower end of the mark range.

The large majority of the scripts seen were well marked and clearly presented. The common marking errors were still in evidence i.e. a lack of understanding regarding precision of values in all types of calculation, a failure to check that students' experimental results were correct before awarding accuracy marks and, from a few schools, a too-relaxed attitude towards the specific requirements of the Marking Guidelines and Additional Guidance. The cumulative effect of too many 'benefit of the doubt' decisions put some schools out of tolerance – there needs to be a clear balance between acceptance and rejection of borderline responses.

CHM3P

Task: The titration was very well done with many students getting full marks. There was the usual range of marking errors despite the very clear comments in the Marking Guidelines, but these errors were from a relatively small number of schools. The errors included allowing a mark despite a student failing to give a 'Titre' results column, missing one or more values not given to the correct precision and missing arithmetic errors in the final titre.

In the Written Test Section A, Q1 was answered correctly by most, though a few averaged all their titre values including those that were non-concordant. In Q2 and Q3 precision was frequently incorrect and also frequently ignored. All parts of Q4 were usually well done. In Q5 there was some confusion over unit conversions but the main error related to an incorrect application of the reacting ratio; consequential marking was allowed here. In Q6 the main point regarding 'washing' was well-appreciated but students frequently penalised themselves by being unable to clearly express the point; incomplete answers were not unusual. The error calculation in Q7 was well known and only a few did not use the burette volume from Q1.

In Section B, the empirical formula calculation in Q8a was well done with very few errors or omissions seen. The complicated formulae in Q8b seemed to cause little confusion and only a lack of care caused a loss of the mark. The safety equipment mentioned in Q8c was usually appropriate but the mention of 'breathing apparatus' by some students was regarded as inappropriate for handling cement bags. The reason for the safety equipment was sometimes poorly described. In Q9b many schools allowed the second mark despite the gas being incorrectly identified. In Q10a, the 'high temperature' requirement was well-known but students often failed to state that the reaction was between nitrogen and oxygen in the air used. In the final part Q10b, use of English was often weak and contradictory answers were not uncommon.

CHM3Q

Task: This involved a thermochemistry experiment using magnesium ribbon and hydrochloric acid. Normally, this type of practical is well done but there were additional difficulties this year as schools were allowed to use thermometers to +/–0.5^{o}C. This caused some problems with precision with many students failing to give a temperature value with a precision to one decimal place. In addition the estimation of accuracy was often flawed with markers using student lines of best fit that were not acceptable. The use of a simple graph-plotting program such as Excel would provide a more objective line for use here. A few students had problems with the reaction continuing for some time after the addition of the magnesium; this caused difficulty later in the Written Test.

In Section A of the Written Test, the plotting of the graph in Q1 caused the usual problems with poor scales and extrapolations but the majority scored well. In the calculation questions that followed there were precision problems particularly with Q4 where an answer of 0.1 instead of 0.10

was very common and frequently overlooked by the marker. The calculation of the mass of magnesium from the length of the magnesium ribbon in Q5 confused some students and the answer, again, was not always precise. Q6 was well done by many with some forgetting the negative sign but fewer than normal. The error calculation in Q7 caused few problems and Q8 was well done, though an incorrect divisor for the percentage was sometimes seen.
In Section B, a common mistake in Q9a was to allow the answer that sulfuric was a stronger acid than hydrochloric without reference to the correct answer relating to concentration of acid ions. In Q9b there was good discrimination but many markers ignored the underlined terms in the Marking Guidelines that had to be present in a correct answer. The question on Grignard Reagents in Q10 was also challenging and many were unable to use their practical experience to think through the context. Q10a was fairly well done but Q10b proved more problematic with poor expression often losing the mark. In Q10c, there was a common mistake in using Tollens' or Fehling's reagent to distinguish the alcohols. The final question Q10d required some careful structuring to achieve full marks and the context of the question (comparing bromide and iodide only) was often ignored. The omission of the concentration of the ammonia solution used for the confirmatory test was a common fault.

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