



General Certificate of Education

Chemistry 1421

**CHM3T Investigative Skills Assignment
(ISA)**

Report on the Examination

2009 examination - June series

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General Comments

The first moderation series for the new Specification has seen centres maintain their excellent and much appreciated efforts, once again ensuring a moderation scheme which ran smoothly and successfully. The very great majority of centres adapted easily to the new format for assessment, and the standard of marking was very good for the great majority of centres.

Administration

The new scheme retained some of the administrative features of the legacy Specification, and most centres submitted a complete, well presented sample for moderation well before the May 15 deadline. All moderators are aware of the time needed to satisfy AQA's instructions regarding the administration of the moderation procedure, and are very grateful that most centres do a good job in preparing the sample.

A significant minority of centres did not complete the paperwork. The main deficiencies were:

- (a) centres forgetting to include target values for the task
- (b) centres with more than one student group forgetting to indicate which target value applied to each individual candidate
- (c) centres forgetting to include a signed Centre Declaration Sheet
- (d) candidates forgetting to sign their Candidate Record Form
- (e) incorrect marks entered on the Centre Mark Sheet.

The moderating team hope that next year all centres will ensure that the paperwork is completed.

PSA

Most centres have quickly come to terms with this section of assessment. The moderator panel was very pleased to note that, judging by the marks awarded, there is much good quality practical work carried out by students.

Marking

The great majority of centres were able to apply the published Marking Guidelines successfully. Additional guidance given during the Standardising Meetings also seems to have been helpful to centres. The most frequent reasons for the recommendation of a mark adjustment were that the centre used an incorrect target value in assessing accuracy in the task and/or the centre's interpretation of the Marking Guidelines was unduly generous.

The Marking Guidelines cannot cover all possible answers and it is inevitable that teachers will be faced with a range of additional responses. Centres are strongly advised to ask for help from their Assessment Adviser to determine whether an unexpected response is worth credit.

Centres must avoid an understandable tendency to give the candidate the benefit of the doubt whenever an answer is on the right lines, but doesn't really match the required response. Some markers remorselessly allow answers that are very vague indeed, or are simply wrong. The result is serious over-marking leading to the mark awarded to a candidate's script being outside tolerance.

ISA P09**Task**

The titration exercise in the task gave candidates an opportunity to demonstrate their practical skills and high marks were quite common. In one or two centres the average titres recorded were much lower than usual. Centres are reminded that when this happens they must not increase the tolerance boundaries for the accuracy marks.

The teacher must check that the candidate has calculated an average titre correctly and has only used concordant results in the calculation. Accuracy marks are based on the correct average titre. Some centres were unduly lenient when awarding the mark for precision of recording. Centres are reminded that candidates must record all non-zero volumes to 0.05 cm³.

Written paper

This paper proved quite demanding and a wide range of marks was seen. The main problem areas are given below.

Section A

In Question 1 candidates should not have been given the mark if they had included a non-concordant titre in the average.

In Question 3 a number of centres simply ignored the requirement to give the M_r value to one decimal place. When a numerical answer is required to a specified precision, a mark cannot be awarded unless the candidate's answer is given to the same specified precision.

Candidates' answers to Question 7 were often quite vague. 'Sucrose does not affect the pH' was not worth a mark.

Section B

In Question 8 most candidates easily scored the first two marks, but converting the ratios to an empirical formula was more demanding. Some centres virtually awarded this mark by default, even when the candidate's explanation for the third mark was simply wrong.

In Question 10(a) the candidate was required to draw simple apparatus. Many candidates drew a practical set-up that would not work. The common problems were that the gas could not escape from the preparation vessel or that the collection vessel was not graduated and could therefore not record volume. A number of candidates assembled apparatus that was unsafe and should not have been awarded any marks at all. Marking of this question was often very generous indeed.

In Question 10(b) the candidate was required to draw a simple graph. This generated the usual problems with marks being wrongly awarded for plotted points which did not cover half the paper and for graphs containing incorrectly plotted points. If the candidate's graph included the origin, then the candidate's line had to pass through the origin to score the line of best fit mark.

When candidates wrote 'because a gas is produced' as an answer to Question 11 they were often credited with a mark. In general, candidates do not receive a mark for basically rewording part of a question rubric. The Marking Guidelines were quite clear that the effect on the human body was needed in a correct answer.

Question 12 was, perhaps, the most demanding question of all. Full marks were rarely seen because the great majority of candidates struggled to express themselves clearly. Marking of this question was often very generous indeed. Candidates were often given a mark for any chemical reference to empirical or molecular formula. In this question two distinct ideas were required for the full award. Candidates needed to link molecular formula to empirical formula as a multiple and then say that a small error in the molecular formula mass would still allow a good judgement of which multiplier should have been used.

Marking was often very generous in Question 13. When candidates are asked to suggest reasons why an experiment might not deliver the expected result the candidate is expected to suggest something more imaginative than 'misread the apparatus' or 'the apparatus was faulty'. The Marking Guidelines were quite clear that a reference to when the apparatus was assembled was needed for a gas leak to be worth a mark. The idea of the gas remaining in the flask was not sufficient unless the possibility of the gas dissolving was specifically mentioned.

In Question 14 a statement of the Gas Law was often given a mark. ' $PV = nRT$ ' is not a sufficient answer since it does not show that the candidate understands what the equation means in regard to the volume of the gas.

In Question 16(a) centres were too generous in the interpretation of the key words in an answer. "Less soluble" and "not very soluble" were not acceptable alternatives to "least soluble".

Centres are asked to check candidates' equations carefully. Some candidates had an incorrect equation for Question 17 but were still given a mark.

ISA Q09

Task

The thermochemistry exercise in the task proved more demanding than in the titration in ISA P09 and high marks were not quite so common. In a number of centres candidates appeared to be using 0.5°C thermometers. Centres are reminded that candidates rarely obtain good results with these thermometers and consequently cannot access the highest marks in the task.

For a number of centres the assessment of a thermochemistry exercise presents considerable difficulties. Whilst most candidates worked methodically through the determination of a corrected temperature rise, the teacher made no allowance for a difference in starting temperature of the two reagents. As a result the accuracy marks for candidates were based on an incorrect target value, and this was enough to place the marks out of tolerance. At the risk of stating the obvious, the teacher **must** ensure that the teacher results are processed in the same way as the candidate's results.

In addition the teacher must also ensure that the candidate has plotted the graph and extrapolated correctly. If this is clearly not the case, the supervisor must plot the graph and base the candidate's marks for accuracy on the correct plot.

Some centres were again unduly lenient when awarding the mark for precision of recording.

Written paper

Section A

In Question 1 the candidate was required to draw a graph using their results from the task. Centres are again reminded that marks cannot be awarded for plotted points which do not cover half the paper and for graphs containing incorrectly plotted points.

In Question 5 a number of centres simply ignored the requirement to give the temperature rise to one decimal place. When a numerical answer is required to a specified precision, a mark cannot be awarded unless the candidate's answer is given to the same specified precision.

In Question 10 a mark could only be awarded if the candidate gave a specific hazard for a named reagent or product. Phrases such as 'spilling the acid', 'getting acid in the eyes' and 'the chemicals are corrosive' were not precise enough to be worth a mark.

In Question 11 the candidate needed to make a correct reference to the quality of the lines of best fit and the extrapolations to score both marks. Some comments bore little relevance to the candidate's own graph yet marks were still awarded.

Section B

In Question 19 a candidate could only score a mark for an observation if the correct reagent was used.

The above notes are intended for that small minority of centres experiencing difficulty in meeting the coursework criteria. They must not be allowed to unduly detract from the very healthy overall picture. Given the pressures on centres to deliver the teaching programme, this was once again a very positive and encouraging outcome. Centres are again warmly commended for the trouble taken to assemble a sample which proved to be easy to moderate. Their efforts continue to be much appreciated by the moderation team.
