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General Certificate of Education

Chemistry 1421

CHM3T Investigative Skills Assignment (ISA)

Report on the Examination

2010 examination - June series

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General Comments

The second series for the new specification has seen centres again maintain their excellent and much appreciated efforts. The moderation scheme ran smoothly and successfully. The very great majority of centres have come to terms with the new format for assessment, and the standard of marking was even better than last year.

Administration

Most centres submitted a complete, well-presented sample for moderation well within 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 smaller number of centres than last year did not complete the paperwork. The main deficiencies continue to be:

(a) Forgetting to include target values for the task, although happily there were fewer instances this year.

(b) Centres with more than one student group forgetting to indicate which target value applied to each individual candidate.

(c) Forgetting to include a signed Centre Declaration Sheet.

(d) Candidates forgetting to sign their Candidate Record Form.

(e) A surprisingly large number of candidates with incorrect marks entered on the Centre Mark Sheet.

The moderating team was pleased that the great majority of centres completed the paperwork in full, and hope that the improvement will continue.

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 being done by students. The inevitable consequence is that this section does not discriminate between candidates. Scores of 11 or 12 for this section are common for candidates at the E grade boundary.

Marking

The great majority of centres were able to apply the published Marking Guidelines successfully, and with commendable accuracy. The greater detail in the Marking Guidelines seems to have been welcomed by teachers, and the 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 continue to be 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 reminded that their Assessment Adviser can provide guidance on the application of the Marking Guidelines.

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 and the candidate's script is outside tolerance.

ISA CHM3T/P10

Task

Few centres had difficulty with the titration exercise in the task. Candidates took the opportunity to demonstrate their skills in this most traditional of practical exercises and high marks were again 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. A few centres recorded very high titres perhaps because of a mistake in making up a solution to the required concentration. Teachers are reminded that if the teacher value is obtained before the candidates undertake the task then such mistakes are unlikely to occur.

Candidates must be told that a complete table will require columns for *Initial volume*, *Final volume* and *Titre*. 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 cm^3.

Centres are reminded that if something goes drastically wrong with a task the centre must contact the Chemistry Subject Office at AQA for guidance.

ISA Written Test

This paper proved quite demanding and a wide range of marks was seen. It must be stressed that the great majority of teachers were able to apply the guidelines and mark accurately. The long list of problem areas given below are mainly intended to help the inexperienced teacher, or those new to the AQA scheme.

Section A

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

In volumetric calculations, such as Question 2, the marker must resist the temptation to award marks for 'having a go'. To score both marks the candidate must use the volumes of acid and alkali in the correct way, and obtain a correct final answer.

In Question 4, a number of centres continue to overlook 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.

In Question 5, a number of centres failed to allow a consequential mark for a correct calculation using the candidate's incorrect answer to Question 3.

Candidate's answers to Question 8 were often quite vague. 'Use a greater volume' without qualification, or 'use more accurate apparatus' was not worth a mark.

'They may affect the pH' was not worth a mark in Question 9.

Section B

Virtually all candidates scored the mark in Question 11(a), and most candidates could make the ratio adjustment in Question 11(b). Some markers incorrectly penalised the precision of the answer in Question 11(c) when the candidate had already made this mistake in Question 4.

In Question 12, a large number of candidates did not appreciate that a concentrated acid is likely to be corrosive. They defaulted to 'harmful', as a general hazard for a chemical substance. Others answered without stating a hazard – 'it would get in your eyes', for example. Neither of these answers was worth a mark.

In Question 13(a), the vast majority of candidates correctly stated the ideal gas equation. Many came unstuck in the calculation in Question 13(b), and this was an area where some teachers were very generous. An incorrect unit often went unpunished.

In Question 14, many candidates wrote a correct equation which included fractional numbers of moles. This version of a multiple of the expected answer is acceptable and should have been rewarded with a mark.

Question 15 was poorly answered. Most candidates simply calculated the ratio of the numbers given in the stem and converted to a percentage. This was not worth a mark. Yield calculations must start with the appropriate M_r values to earn any credit.

Few candidates could not make some progress in the empirical formula calculation in Question 16(a), but many were unable to deduce a M_r value from the spectrum in Question 16(b). The provision of dummy data in Question 16(c) allowed most candidates to score at least one of the marks.

ISA CHM3T/Q10

Task

The observation exercise in the task proved demanding, and high marks were not quite so common. In particular, the instruction to 'Continue to add nitric acid until no further change occurs.' caught out many candidates and a number of teachers. Candidates need to be made aware that this type of instruction does not imply a specific volume and that a considerable excess may be needed.

Many centres allowed marks when the candidate's results matched the teacher's results for an incomplete reaction in Test 4, and a large number of candidates were awarded scoring points they did not deserve. Centres are reminded that the teacher's results will be accepted by the moderator when they are reasonable. The acceptance of alternative observations is mainly intended to allow for errors in the practical exercise itself, such as the candidates being given a solution of the wrong concentration or the wrong reagent. They are not intended to allow marks to be given to candidates who do not complete the task as directed.

ISA Written Test

This paper proved accessible to candidates but a fewer number of the higher marks were seen. The main problem areas are given below.

Section A

In Questions 1 and 2, a number of candidates lost marks because they gave the name of the halogen, rather than the halide ion.

In Question 3, many candidates omitted the state symbols or gave incorrect symbols in the equation. It was quite common to see an incorrect equation being given the mark.

In Question 4, most candidates appreciated that the reaction was a neutralisation.

Question 5 proved surprisingly demanding but most candidates answered Question 6 correctly.

Many candidates continue to struggle with questions such as Question 7, seemingly unable to apply a little lateral thinking.

Section B

Virtually all candidates scored the first mark in Question 8, and most candidates completed the graph. Sadly, some teachers continue to struggle when marking graphs. Moderators saw 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 a candidate wants to include the origin as a plotted point to establish a suitable scale the graph must extend to the origin. 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. The line of best fit mark cannot be awarded when the line itself is poorly drawn or doubled in places.

In Question 9, centres are reminded that the mark is obtained by plotting the graph correctly **and** reading correctly from the graph.

Candidates either scored both marks in Question 10 or made no useful progress.

Candidates have a good appreciation of the calculation of apparatus errors and a majority scored both marks in Question 11.

Candidates similarly showed a sure touch in commenting on their graphs in Questions 12(a) and 12(b).

Question 13 was, perhaps, the most demanding question of all. Very few candidates indeed appreciated the original terms of reference for the experiment.

Question 14(a) was well answered, but many candidates proposed hopelessly expensive treatments in Question 14(b).

The equation for halogen displacement was answered better than expected in Question 15 and most candidates scored the mark in Question 16.

Question 17 proved demanding. A surprising number of candidates did not see that a black solid obtained from organic material is likely to be carbon. Many of those who did couldn't name the conversion process in Question 17(b). The two-step process in Question 17(c) was also surprisingly elusive. The need to add water before filtration was the usual omission.

The 2:1 ratio needed for an equation involving a Group II metal hydroxide caused the usual problems in Question 18, while a vague answer was the usual reason the loss of the mark in Question 19.

The above notes are intended for that small minority of centres experiencing difficulty in meeting the marking criteria. They must not be allowed to detract unduly 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 session. 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 moderator team.