A-LEVEL
CHEMISTRY

CHM3X Investigative and Practical Skills in AS Chemistry
Report on the Examination

2420
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Administration

Most schools and colleges submitted scripts and the associated paperwork by the 15 May deadline.

Few schools and colleges did not complete the paperwork properly. The main deficiencies continue to be:

- forgetting to include teacher results for the tasks, or including the teacher results for the wrong EMPA
- schools and colleges with more than one student group forgetting to indicate which teacher result applied to each individual student, or labelling in a manner which made it unclear
- schools and colleges forgetting to include a signed Centre Declaration Sheet, although this was a very small number this year.

Although most were fine, some of the teacher results documentation was a little lacking. A few teachers had failed to record values to the appropriate precision in Task 1 and some had mistakes in their calculations. Some descriptions of the observations in Task 2 were also sometimes vague. A number of schools and colleges do not seem to realise that the teacher results for an observation exercise provide a check that the correct solutions have been given to the students. The marker will accept a teacher alternative as long as it is reasonable. If the great majority of students in the group obtain the expected result, the teacher result will be ignored. The teacher results from a small number of schools and colleges appeared to be little more than a summary of the students' answers, which is clearly unacceptable.

Task 1

The preparation of the standard solution was a twist on a fairly routine volumetric analysis practical. Marks awarded for this task were generally high. There were, however, a few cases of initial titration volumes of 50.00, incomplete tables and slips in calculations. Precision was a bit more of a problem with some students failing to record titration data to 0 or 5 in the second decimal place. A small number of students were unfortunate to lose the recording mark for the weighings because they failed to use the same degree of precision throughout.

Task 2

Most students scored at least 4 marks for accuracy. They recorded the information clearly in the form of a colour and a physical state with very few giving 'milky' or 'white solution' etc. A common error was a failure to record two observations for Test 3 (one for the initial observation and then one for the 'excess'). The knock-on effects of the observations (linked to the teacher results) were borne in mind when marking the Written Test.

Written Test

Section A

The calculations based on the student's data from Task 1 were generally done well but students should be warned against averaging all values rather than just the concordant ones. In Question 3(a), most students failed to multiply by 10 and this led to very large values for the M_r of the succinic acid (and hence n). It seems that some re-checked their earlier calculation but some simply lost a power of 10 in order to obtain a sensible answer. Some students doubled the error in Question 4 despite the question stating that it was the total error that was given. In Question 5, 'low

concentration' was not allowed but this was closer to a correct answer than ideas about the succinic acid in food being somehow different from the one students were investigating. In Question 6, many sensible ideas about carbon dioxide emissions in general were not credited because they didn't address the question which was based on the fermentation process itself.

The questions based on Task 2 were sometimes complicated by the difficulty some students had with the observations. In Question 7(a), an answer based on the Test 3 result was expected and in Question 7(b) an answer based on the result from Test 2 was expected although sensible deductions based on other observations were credited where appropriate. Some students found it difficult to express what they were trying to describe and so failed to gain the mark. Question 7(c) required students to use of all the evidence (including the observations with ammonia solution) and quite a few lost marks for errors such as 'chlori**n**e ion'.

Section B

Question 8(a) was mostly well answered, with the exception of those who chose to use the wrong mass. In Question 8(b), failure to give the negative sign was the most common error where students did not score full marks. Question 8(c) was usually done very well. In contrast, Question 8(d) was very poorly answered, almost always because –2642 was used from Question 8(c) rather than their answer to Question 8(b). Many vague answers were seen in response to Question 8(e). Simply adding insulation was insufficient and use of a polystyrene cup was wrong in this situation. The idea of incomplete combustion seemed to be poorly understood in Question 8(f), with quite a few students stating that 'not all the alcohol had burned'. Comments about heat loss etc were disqualified by the question. Many students saw Question 9 as fairly standard and did very well although a few forgot to include 'acidified' in the reagent and some, wrongly, chose to use Fehling's solution.

Section C

In Question 10(a), 'amount' was not sufficient. Many students simply referred to measuring the mass of the reagents but, since this is not practically possible without including the container too, it was not credited. Surprisingly, many students incorrectly wanted to measure the temperature. In Question 10(b), 'reagents' was insufficient since it is the magnesium that is critical. Although the quality of the diagram was not part of the assessment, poor diagrams often failed to show a clear filter funnel and a visible filter paper; this was penalised. For some reason, a large number of students decided incorrectly that distillation was the required process. The final question simply needed 'wash with water' and yet attracted some very complicated answers.

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