



A-level **CHEMISTRY**

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

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Task 1

The accuracy marks were awarded to the traditional tolerances because this was a fairly straightforward titration. There were very few errors in presentation of results such as failure to give 0 or 5 in the second decimal place of the titration volume or a failure to give a complete table with initial volume, final volume and delivered titre.

Task 2

Most students reported the correct observations but some did so in inappropriate ways. “Goes white” and “white solution” have never been credited and yet some students and teachers persist in using these terms. As always, credit was given to the candidate whose results matched either the expected observations or those of the teacher. This year, more schools than usual reported teacher observations that were clearly unexpected given the reagents being used. It is hoped that these would have been spotted during a trial experiment and either corrected or advice sought from the Practical Advisor. This year seemed to have more differences between expected observations and teacher observations than in the past.

Test Section A

Q1 Mostly correct. Occasionally a candidate would take an average of all values even if non-concordant.

Q2 Mostly correct.

Q3 Many correct (3/3) but some failed to quote the answer to an appropriate precision (3 significant figures in this case).

Q4 Poorly done. A few who were successful in the calculation let themselves down by ignoring the requirement for three significant figures.

Q5 Mostly correct. Those who failed to answer this correctly usually applied the tolerance to a different piece of equipment. This sort of question has often been asked in the past but usually in connection with the pipette or burette.

Q6 Mostly correct (especially regarding the first two marks).

Q7 Only the best candidates were able to identify the solution and then give a complete explanation. Some careful consideration was given to the relevance of the candidate's own observation to see if a mark could be justified but it was rare to find creditworthy statements if the identification was incorrect.

Q8 Many identified the solution correctly, although some did not answer in terms of an ion for M2.

Test Section B

Q9 Only the best candidates were able to gain all five marks. Worryingly, many candidates seemed to attempt to measure the specific heat capacity of the alcohol by heating it in a water bath. Vague descriptions such as “burn some alcohol to heat some water” with a failure to state what variables need to be measured were also fairly common. Some wanted to use a polystyrene cup to hold the water. There were some very good answers too, though.

Q10 Generally well done.

Q11 Generally well answered. An incomplete reagent such as missing the condition “acidified” lost M1 but subsequent marks were available. Tollens’ reagent and Benedict’s reagent were favourite incorrect answers.

Q12 Only the best candidates were able to score full marks. There were many correct equations although some gave an unbalanced chemical equation forgetting the “O” in the alcohol and some gave only an equation for complete combustion. A common mistake was to give two environmental concerns or two economic concerns even though the question required one of each.

Test Section C

Q13 This was poorly answered. Many candidates produced a diagram of a distillation such as might be used to collect the aldehyde. Of those who attempted to draw a reflux assembly, many failed to have proper seals and proper openings in the appropriate places. Quite a few candidates actually made a point of stating that the top was sealed. Some failed to include reagents or a heat source.

Q14 Many answered this question well but a common error was to describe in detail a recrystallisation.

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](#)