



General Certificate of Education
Advanced Subsidiary Examination
June 2014

Chemistry

CHM3T/P14/TN

Unit 3T AS Investigative Skills Assignment

Teachers' Notes

Confidential

The Exams Officer should make two copies of these Teachers' Notes; one copy for the Head of A-level Chemistry and one for the technician. These copies can be released to the Head of A-level Chemistry and the technician at any point following publication but must be kept under secure conditions at all times. Teachers can have sight of the Teachers' Notes but no further copies should be made.

All teacher-assessed marks to be returned to AQA by 15 May

Teachers' Notes

Confidential

These notes must be read in conjunction with the **Instructions for the Administration of the Investigative Skills Assignment: A-level Chemistry** published on the AQA Website. Please note that these have been revised for 2014.

The determination of the composition of a mixture

Materials

Each candidate should be provided with the following reagents in suitable closed containers.

Reagent	Concentration / mol dm ⁻³	Volume / cm ³	Note
Sodium hydroxide	Between 0.090 and 0.100	200	Labelled ' Solution A '
Hydrochloric acid	Between 0.100 and 0.110	175	Labelled ' Hydrochloric acid '
Phenolphthalein	Standard indicator		Labelled ' Phenolphthalein ' Individual supply not required

General

It is the responsibility of the centre to ensure that the investigation works with the materials provided to the candidates **before** candidates carry out the task.

Spare supplies of all reagents specified in these notes must be available.

If you have any queries about the practical work for the ISA, please contact your Assessment Adviser. Contact details for your Assessment Adviser can be obtained by emailing your centre name and number to science-gce@aqa.org.uk

Apparatus

Each candidate will require the following:

- 50 cm³ burette and stand
- funnel suitable for filling a burette
- 25 cm³ pipette
- pipette filler
- 250 cm³ conical flask
- dropping pipette
- plentiful supply of distilled or deionised water
- eye protection.

Checking the burette reading

In the task, candidates are instructed to have one of their final burette readings checked by their teacher in order to assess their ability to read the burette. If a candidate has not read the burette correctly, the teacher must tell the candidate the correct reading and not award this mark. This is to ensure that a candidate does not lose several accuracy marks because of an incorrect reading.

Risk assessment and risk management

Risk assessment and risk management are the responsibility of the centre.

Notes from CLEAPSS

Technicians/teachers should always follow the latest CLEAPSS Hazcards or safety data sheets provided by the supplier for guidance on handling reagents. The worldwide regulations covering the labelling of reagents by suppliers have changed. More details about these changes can be found in CLEAPSS secondary science guidance leaflets, including GL101, which is an introduction to classification, labelling and packaging (CLP): chemical hazard labelling.

Additional information

AQA might publish additional information about an ISA practical. This will be placed on e-AQA in Secure Key Materials. We will email Exams Officers who have downloaded the particular Teachers' Notes so they can print a copy for the Head of A-level Chemistry. Additional information may cover issues such as suitable suppliers or tips on getting a practical to work.

Teacher results

A teacher must carry out the task, using similar apparatus and samples of the same stock solutions/chemicals as the candidates, in order to obtain teacher results. This must **not** be done in the presence of candidates.

Teacher results:

- are required for each group of candidates
- must be recorded on the Teacher Results Sheet
- are used to assess the accuracy of candidates' results
- must be included with the sample sent to the moderator.

In order to ensure that each candidate can be matched to the appropriate teacher result, teachers must:

- complete all details on each Teacher Results Sheet
- ensure that all candidates complete all details on the Candidate Results Sheet, clearly identifying their teaching group and/or teacher.

Centres with more than one teaching set

Centres may wish to divide their candidates into manageable groups and to conduct the task at different times. This is acceptable provided that candidates in a later session are given a solution of sodium hydroxide or hydrochloric acid whose concentration is slightly different from that given to candidates in the earlier sessions.

Each centre must arrange for all of their candidates to complete a particular ISA Written Test on the same day within the assessment window.

Data Sheet

Centres should be aware that the three tables of data on the Data Sheet have been relabelled for the 2014 assessments. As a consequence, centres must ensure that candidates use the version provided at the end of the ISA Written Test and not any version previously supplied.

Information to be given to candidates

Candidates **must not** be given information about an ISA assessment until 1 week before Stage 1. One week before Stage 1, candidates should be given the following information.

The aim of this task is to determine the composition of a mixture containing sodium hydroxide by means of a titration.

The main area of the specification in the Written Test is Section 3.1.2 (Amount of Substance).

There **must** be no further discussion and candidates **must not** be given any further resources to prepare for the assessment.

ISA CHM3T/P14 Teacher Results SheetCentre Number

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Teacher Name Teacher Group

Results

Record your results in the table below.

Final burette reading / cm ³				
Initial burette reading / cm ³				
Volume of solution A used / cm ³				
Tick the titres to be used in calculating the average titre				

Average titre / cm ³	
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This sheet may be photocopied**Turn over ►**

Task Sheet

The determination of the composition of a mixture

Hydrochloric acid is used to clean the surface of bricks and concrete. After use, any unreacted acid is collected in holding tanks, then neutralised by adding sodium hydroxide. In practice, a slight excess of alkali is used so that a mixture of sodium chloride and unreacted sodium hydroxide remains. The composition of this mixture can be determined by titration.

You are provided with solution **A**, containing sodium chloride and sodium hydroxide. Solution **A** will be titrated with hydrochloric acid.

Procedure

- **Wear eye protection at all times.**
 - **Assume that all solutions are toxic and corrosive.**
- 1 Rinse a burette with solution **A**. Set up the burette and use a funnel to fill it with solution **A**. Record the initial burette reading in a table of your own design on the Candidate Results Sheet.
 - 2 Use a pipette filler to rinse a pipette with the hydrochloric acid provided. Use this pipette to transfer 25.0 cm^3 of the hydrochloric acid to a 250 cm^3 conical flask.
 - 3 Add 3 or 4 drops of phenolphthalein indicator to the conical flask.
 - 4 Add solution **A** from the burette until the mixture in the conical flask just turns pink. The colour may fade on standing. You should therefore record the burette reading when the colour first changes and not add more solution **A**.
 - 5 Rinse the conical flask with distilled or deionised water. Repeat the titration until you obtain **two** titres that are within 0.10 cm^3 of each other. You should do no more than five titrations.
Have one of your final burette readings checked by your teacher.
 - 6 Calculate and record the average titre on the Candidate Results Sheet. Show clearly the titres that you used in calculating this average titre.

You are **not** required to carry out any further calculations on the Candidate Results Sheet. You will use your results in **Section A** of the Written Test.