



General Certificate of Education
Advanced Level Examination
June 2013

Chemistry

CHM6T/P13/TN

Unit 6T A2 Investigative Skills Assignment

Teachers' Notes

Confidential

A copy should be given immediately to the teacher responsible for
GCE Chemistry

Teachers' Notes

Confidential

These notes must be read in conjunction with the *Instructions for the Administration of the Investigative Skills Assignment: GCE Chemistry* published on the AQA Website.

An investigation of some organic compounds

The aim of this task is to identify the functional groups in four organic compounds by a series of observation exercises.

Materials

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

Reagents	Concentration	Volume / cm ³	Note
Methanoic acid	Approximately 3 mol dm ⁻³	10	Labelled ' Solution A '
Glucose	Approximately 100 g dm ⁻³	10	Labelled ' Solution B '
Propanone	For each dm ³ of reagent solution add 250 cm ³ of propanone to 750 cm ³ of water	10	Labelled ' Solution C '
Propanoic acid	Approximately 1 mol dm ⁻³	10	Labelled ' Solution D '

Candidates will also require access to the following reagents. Individual supplies are not required.

Reagents	Concentration	Volume / cm ³	Note
Benedict's reagent	Each dm ³ of reagent solution contains 100 g of anhydrous sodium carbonate, 173 g of sodium citrate and 17.3 g of copper(II) sulfate pentahydrate	5	Labelled ' Fehling's solution '. Solutions of Benedict's reagent purchased from chemical suppliers can be used but must be tested.
Potassium manganate(VII)	For each dm ³ of reagent solution add 250 cm ³ of 0.02 mol dm ⁻³ potassium manganate(VII) to 750 cm ³ of 1.0 mol dm ⁻³ sulfuric acid	5	Labelled ' Potassium manganate(VII) solution '
Sodium hydrogencarbonate	Approximately 1 g of solid		Labelled ' Sodium hydrogencarbonate '
Iodine	Each dm ³ of reagent solution contains 10 g of iodine and 40 g of potassium iodide	5	Labelled ' Iodine solution '
Sodium hydroxide	Approximately 2.0 mol dm ⁻³	5	Labelled ' Sodium hydroxide solution '

Note

Centres are reminded that it is essential that contamination of shared reagents is avoided. One way to avoid cross-contamination is to attach a test tube containing a plastic dropping pipette to the reagent bottle using elastic bands or adhesive tape. This dropping pipette can then be returned to the test tube after use by the candidate.

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 solutions 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 e-mailing your centre name and number to chemistry-gce@aqa.org.uk

Apparatus

Each candidate will require the following:

Number	Apparatus
12	test tube *
8	dropping pipette **
1	test-tube rack
1	small spatula
2	250 cm ³ beaker
	hot water is needed for part of the task. Centres are advised to use an electric kettle to provide a convenient and quick supply of hot water. Alternatively, each candidate will need a tripod, gauze and Bunsen burner . It is important that the water is hot.
	a plentiful supply of distilled or deionised water
	eye protection

* Candidates need some way of identifying the test tubes for Tests 1 and 2. The centre may provide test tubes labelled A, B, C and D. Alternatively, each candidate will need a marker pen. In Test 4, candidates will need to reuse the test tubes used in Test 3.

** Only 4 dropping pipettes will be needed if the centre adopts the strategy to avoid contamination outlined in the note at the top of this page.

Risk assessment and risk management

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

Notes from CLEAPSS

Technicians/teachers should follow safety data sheets provided by the supplier for handling reagents. The worldwide regulations covering the labelling of reagents by suppliers are currently being changed. Details about these changes can be found in leaflet GL101, which is available on the CLEAPSS Website. You will need a CLEAPSS login.

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.

Information to be given to candidates

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

The aim of this task is to identify the functional groups in four organic compounds by a series of observation exercises.

The main areas of the specification in the Written Test include Section 3.4.3 (Acids and Bases), Section 3.4.5 (Compounds Containing the Carbonyl Group), Section 3.4.10 (Organic Synthesis and Analysis) and Section 3.4.11 (Structure Determination).

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

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Results Record your observations in the table below.

Teacher Name

Use a separate sample in each of the following tests.	Observations with Solution A (Methanoic acid)	Observations with Solution B (Glucose)	Observations with Solution C (Propanone)	Observations with Solution D (Propanoic acid)
<p>Test 1 Fehling's solution Place about 10 drops of the sample in a test tube. Add about 10 drops of Fehling's solution and shake the mixture. Half fill a 250 cm³ beaker with the freshly boiled water provided. Stand the test tube in the beaker of hot water for about 10 minutes.</p>				
<p>Test 2 Potassium manganate(VII) Place about 10 drops of the sample in a test tube. Add about 10 drops of potassium manganate(VII) solution and shake the mixture. Half fill a second 250 cm³ beaker with the freshly boiled water provided. Stand the test tube in the beaker of hot water for about 10 minutes.</p>				
<p>Test 3 Sodium hydrogencarbonate Place about 10 drops of the sample in a clean test tube. Use a spatula to add a small amount of solid sodium hydrogencarbonate.</p>				
<p>Test 4 Iodine / sodium hydroxide Place about 10 drops of the sample in a clean test tube. Add about 20 drops of iodine solution and shake the mixture. Add sodium hydroxide solution dropwise until the yellow colour of the iodine is no longer visible.</p>				

This sheet may be photocopied