



General Certificate of Education  
Advanced Level Examination  
June 2011

**Chemistry**

**CHM6T/Q11/TN**

Unit 6T A2 Investigative Skills Assignment

**Teachers' Notes**

**Confidential**

A copy should be given immediately to the teacher(s) 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.

**Some reactions of iron(II) and iron(III) compounds**

Candidates are to prepare a crude sample of an inorganic complex, *Prussian Blue*, by mixing solutions of ammonium iron(III) sulfate and potassium hexacyanoferrate(II). The Centre will need to advise candidates of the suitable filtering process. This should be by means of a fluted filter paper mounted in a funnel. The following website may be helpful.

<http://www.chem.ubc.ca/courseware/DZEorganiclabCD1/cd1/cd1-5.html>

Teachers may prefer to show their candidates how to prepare and use a fluted filter paper.

The solid left to dry by the candidate should be assessed at the end of the Task and should then be disposed of safely.

In addition, test tube reactions will be carried out on solutions of iron(II) and iron(III) ions.

**Materials**

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

Reagents	Concentration	Quantity	Note
Ammonium iron(III) sulfate-12-water	solid	1.2 g	Labelled ' <b>Iron(III) salt</b> '
Potassium hexacyanoferrate(II) solution	0.1 mol dm <sup>-3</sup>	20 cm <sup>3</sup>	Labelled ' <b>Potassium hexacyanoferrate(II) solution</b> '
Ammonium iron(II) sulfate-6-water solution	0.1 mol dm <sup>-3</sup>	10 cm <sup>3</sup>	Labelled ' <b>Iron(II) sulfate solution</b> ' Make up this solution just before the Task. Do not make up this solution in acid.
Iron(III) nitrate solution	0.1 mol dm <sup>-3</sup>	10 cm <sup>3</sup>	Labelled ' <b>Iron(III) nitrate solution</b> '
Sodium hydroxide solution	0.1 mol dm <sup>-3</sup>	10 cm <sup>3</sup>	Labelled ' <b>Sodium hydroxide solution</b> '
Sodium carbonate solution	1 mol dm <sup>-3</sup>	10 cm <sup>3</sup>	Labelled ' <b>Sodium carbonate solution</b> '

## General

This investigation has been trialled successfully.

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.

Reagents of good quality should be used and spare supplies of all solutions specified in these notes must be available.

Teachers should instruct candidates where they can leave their solid complexes on a 'suitable labelled surface' for teacher inspection. This could be watch glasses or petri dishes or other convenient apparatus as decided by the Centre.

Following the preparation of the solid complex made by each candidate, the sample must be assessed by the Centre as soon as possible following completion of the Task according to the Marking Guidelines and the result recorded on the Candidate Results Sheet.

## Apparatus

Each candidate will require the following:

Number	Apparatus
1	distilled or deionised water bottle
1	10 cm <sup>3</sup> measuring cylinder
1	stirring rod
1	100 cm <sup>3</sup> beaker
1	filtration apparatus
	filter paper
1	watch glass or petri dish or white tile (to place damp filter paper on)
1	label for the watch glass
6	test tube
1	test tube rack
5	dropping pipette
1	250 cm <sup>3</sup> conical flask (to support filter funnel)
	disposable gloves

## Teacher Result

A teacher must carry out the Task, **both** the preparation of the solid complex and the test tube reactions. Teacher observations are required for **each** group of candidates.

**The teacher's test tube observations along with the Teacher Group, must be recorded in the space provided on the Teacher Results Sheet.**

The results of the preparation of the solid complex and the observations are needed by the teacher to assess the candidates' results. The teacher must **not** carry out the Task in the presence of the candidates.

In order to ensure that the appropriate Teacher Result can be matched with each candidate, teachers must ensure that candidates complete all the boxes on the Candidate Results Sheet, including 'Teacher Group'.

**The Teacher Results Sheet(s) must be included with the sample sent to the moderator.**

## 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.

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 examine some reactions of iron(II) and iron(III) compounds. The main areas of the specification covered in the Written Test include 3.5.4 (Transition Metals) and 3.5.5 (Reactions of Inorganic Compounds in Aqueous Solution).

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

ISA CHM6T/Q11 Teacher Results Sheet

Centre Number

Teacher Name..... Teacher Group .....

Part 1 and 3 Sample of solid complex obtained (please tick).....

Part 2

	Iron(II) sulfate solution	Iron(III) nitrate solution
<p><b>Test 1 – Test with sodium hydroxide solution</b> Place about 10 drops of iron(II) sulfate solution in a test tube. Add about 10 drops of sodium hydroxide solution and shake the mixture. Continue shaking the mixture for a minute. Repeat the test using 10 drops of iron(III) nitrate solution.</p>		
<p><b>Test 2 – Test with sodium carbonate solution</b> Place about 10 drops of iron(II) sulfate solution in a test tube. Add about 10 drops of sodium carbonate solution and shake the mixture. Repeat the test using 10 drops of iron(III) nitrate solution.</p>		
<p><b>Test 3 – Test with potassium hexacyanoferrate(II) solution</b> Place about 10 drops of iron(II) sulfate solution in a test tube. Add about 10 drops of potassium hexacyanoferrate(II) solution and shake the mixture. Repeat the test using 10 drops of iron(III) nitrate solution.</p>		