General Certificate of Education
June 2009
Advanced Subsidiary Examination

Chemistry CHM3X/TN

Unit 3X Externally Marked Practical Assignment

Teachers' Notes Confidential

These notes should be read in conjunction with *Instructions for the Administration of the Externally Marked Practical Assignment* published on the AQA website.

The identification of a magnesium carbonate mineral

Task 1 Observation exercises

Materials

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

Reagent	Approximate Concentration	Volume	Note
Magnesium chloride solution	0.5 mol dm^{-3}	10 cm^3	Labelled **'A'**
Sulfuric acid	1.0 mol dm^{-3}	5 cm^3	Labelled **'Sulfuric acid'**
Sodium hydroxide	0.5 mol dm^{-3}	10 cm^3	Labelled **'Sodium hydroxide for Task 1'**
Ammonia solution	0.5 mol dm^{-3}	5 cm^3	Labelled **'Ammonia solution'**
Sodium carbonate solution	0.5 mol dm^{-3}	5 cm^3	Labelled **'Sodium carbonate'**

General

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

Apparatus

Each candidate will require:

Number	Apparatus
4	test tube
5	dropping pipette
1	test tube rack
	a plentiful supply of purified water (either distilled or de-ionised)
	suitable eye protection

Teacher Result

A teacher must carry out Task 1 using the same stock solutions. The teacher's observations must be recorded on the Teacher Results Sheet for Task 1. A teacher's observations are required for **each** group of candidates. These observations will be used by the examiner to assess the accuracy of the candidate's results. The teacher must not carry out the task in the presence of the candidates.

Task 2 Acid-base titration

Materials

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

Reagent	Approximate concentration	Volume	Note
Hydrochloric acid	between 0.100 and 0.110 mol dm^{-3}	150 cm^3	Labelled **'Mineral solution for Task 2'**
Sodium hydroxide	between 0.090 and 0.100 mol dm^{-3}	250 cm^3	Labelled **'Sodium hydroxide for Task 2'**
Phenol red	standard indicator		Labelled **'Phenol red'** Individual supply not required

General

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

Apparatus

Each candidate will require:

Number	Apparatus
1	50 cm^3 burette and stand
1	funnel suitable for filling a burette
1	25 cm^3 pipette
1	pipette filler
1	250 cm^3 conical flask
1	dropping pipette
	a plentiful supply of purified water (either distilled or deionised)
	suitable eye protection

Teacher Result

A teacher must carry out Task 2 using the same stock solutions in order to obtain a value for the mean titre. The teacher's value for the mean titre must be recorded on the Teacher Results Sheet for Task 2. A teacher's result is required for **each** group of candidates. This value will be used by the examiner to assess the accuracy of the candidate's value for Task 2. The teacher must not carry out the task in the presence of the candidates.

Managing the tasks

Centres with more than one teaching set

Centres may wish to divide their candidates into manageable groups and to conduct assessments at different times. For Task 2 this is acceptable provided that candidates in a later session are given a sodium hydroxide solution for Task 2 whose concentration is slightly different from that given to candidates in the earlier sessions. For Task 1 no change to the task is required.

One week before sitting Task 1 of the EMPA you may inform your candidates:

The aim of this task is to identify the compound present in a mineral by means of a series of observation exercises and a titration of a solution of the mineral in excess hydrochloric acid with sodium hydroxide.

There should be no further discussion of this topic.

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Teacher Results Sheet for Task 1 **Centre Number** .....

Teacher Name .....

Results

Record your observations in the table below.

Use a separate sample of the mineral solution A in each of the following tests.	**Observations with Solution A**
Test 1 with sodium hydroxide solution Place about 10 drops of **A** in a test tube. Add sodium hydroxide solution, dropwise with shaking, until in excess.	
Test 2 with dilute sulfuric acid Place about 10 drops of **A** in a test tube. Add 10 drops of dilute sulfuric acid and shake the mixture.	
Test 3 with ammonia solution Place about 10 drops of **A** in a test tube. Add ammonia solution, dropwise with shaking, until in excess.	
Test 4 with sodium carbonate solution Place about 10 drops of **A** in a test tube. Add 10 drops of sodium carbonate solution and shake the mixture.	

This sheet may be photocopied.

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Teacher Results Sheet for Task 2 **Centre Number** .....

Teacher Name .....

Results

Record your titration results in an appropriate form in the space below.

Mean titre / cm^3.....

This sheet may be photocopied.