General Certificate of Education
June 2009
Advanced Subsidiary Examination

CHEMISTRY **CHM3T/Q09/TN**
Investigative Skills Assignment

Teachers' Notes **Unit 2 ISA**

CONFIDENTIAL

The investigation of an unknown acid

The aim of this task is to determine the temperature rise during a neutralisation reaction.

Materials

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

Reagent	Concentration	Volume	Note
Sodium hydroxide	approximately 1 mol dm^{-3} (0.95-1.05) This concentration does not need to be accurately known	75 cm^3	Labelled '**Sodium hydroxide**'
Hydrochloric acid	approximately 1 mol dm^{-3} (0.95-1.05) This concentration does not need to be accurately known	75 cm^3	Labelled '**Unknown acid solution**'

General

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

You must complete a Teacher Results Sheet

Apparatus

Each candidate will require:

Number	Apparatus
1	50 cm^3 burette
1	funnel suitable for filling a burette
1	thermometer, measuring 0.2 °C or better, covering at least the range of 0-50 °C
1	stirrer
2	plastic cups (of a size suitable to fit into a 250 cm^3 beaker)
1	250 cm^3 beaker
1	25 cm^3 pipette
1	pipette filler
2	stands, clamps and bosses
1	stop clock
1	wash bottle
	tissue for drying thermometer
	a plentiful supply of purified water (either distilled or de-ionised)
	suitable eye protection

Teacher Result

A teacher must carry out the task, using the same stock solutions, in order to obtain a value for the temperature rise. This value will be used by the teacher to assess the accuracy of the candidate's value (Stage 2, the ISA test). The teacher must not carry out the exercises in the presence of the candidates. The teacher must complete the Teacher Results Sheet by drawing a graph and determine an accurate value for the temperature rise using the method shown in Q1-5 of Section A of the ISA test.

Centres with more than one teaching set

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

Candidates with unsatisfactory results or no results from Stage 1

Some candidates may have observed no cooling of the reaction mixture during the task. These candidates must use the teacher's temperature readings for the task. The teacher must record these temperature readings on the Candidate Results Sheet, which must be given to the candidate at the start of Stage 2.

One week before sitting Stage 1 of the ISA you may inform your candidates:

The aim of this task is to determine the temperature rise during a neutralisation reaction.

There should be no further discussion of this topic.

ISA CHM3T/Q09 Teacher Results Sheet Centre Number | | | | | |

Teacher Name.....

Temperature of the unknown acid/°C	
Temperature rise at 4th minute/°C	