CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2001

ADVANCED SUBSIDIARY LEVEL

MARK SCHEME

MAXIMUM MARK : 25

SYLLABUS/COMPONENT : 8701/3

CHEMISTRY
(Extended)

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

N.B. Boxed references within this marking scheme relate to the accompanying booklet of Standing Instructions

1 (a) Titration Table

Titration table

Give **two marks** if:

all final burette readings are to 2 decimal places,
at least two recorded volumes of **FC 2** added are within 0.10 cm^3,
there is no error in subtraction in the table and an appropriate average has been calculated (a tick on a single titre is acceptable).

Deduct one mark for each error in the above (no negative marks). **2**

Use (g) to calculate the Candidate's average, if this is necessary

Accuracy

See section (g).

Assign accuracy marks by comparing the candidate's average titre (corrected as necessary) with the
Supervisor's value.
Apply spread penalty as shown below

Accuracy marks	
Mark	Difference from Supervisor / cm^3
8	up to 0.10
7	0.10+ to 0.15
6	0.15+ to 0.20
5	0.20+ to 0.30
4	0.30+ to 0.40
3	0.40+ to 0.60
2	0.60+ to 0.80
1	0.80+ to 1.00
0	Greater than 1.00

Spread Penalty	
Range used / cm^3	Deduction
0.20+ to 0.25	1
0.25+ to 0.30	2
0.30+ to 0.40	3
0.40+ to 0.50	4
0.50+ to 0.60	5
0.60+ to 0.80	6
0.80+ to 1.00	7
Greater than 1.00	8

8

Suspect Supervisor Values

Adopt procedure (ii) in (h) for any suspect Supervisor results

If there is not an obvious value from the Candidates' results, use 23.40 as the Standard Value. Report your action to Team Leader on the Centre Accuracy Return.

In all calculations, ignore evaluation errors if working is shown

(b) Give **one mark** for $\frac{Titre}{1000} \times 0.125$ **1**

(c) Give **one mark** for *Answer to (b) x 0.5* **1**

(d) Give **one mark** for *Answer to (c)* $\times \frac{1000}{25}$ or $\frac{Titre \times 0.125}{25.0 \times X} = \frac{2}{1}$ **1**

(e) Give **one mark** for *Answer to (d) x 106.0* **1**

(f) Give **one mark** for *16.75 - Answer to (e)* **1**

Total for Question 1 15

2 **FC 5** is a solution containing Pb^{2+}, Zn^{2+}, NO_3^-

	Test	*Observations* [5]	*Deductions* [4]	
(a)	To 2 cm depth of **FC 3** in a test-tube, add dilute nitric acid.	No reaction **one mark** No colour change No precipitate No gas evolved	Not CO_3^{2-}, SO_3^{2-} or NO_2^- **one mark** *This deduction can only be made from no reaction or no gas (evolved)* (No CrO_4^{2-} is wrong – colour)	**2**
(b)	To 2 cm depth of **FC 3** in a boiling-tube, add aqueous sodium hydroxide. Warm the solution.	White precipitate Soluble in excess **one mark** *(from both observations)* No ammonia **or** no positive test for ammonia described) **one mark**	Al^{3+}, Pb^{2+}or Zn^{2+} **one mark** (from both observations) No NH_4^+ **one mark** *Allow this deduction from no gas (evolved) or gas having no effect on litmus paper*	**4**
(c)	Cool the solution remaining from test **(b)**, add aluminium foil and cautiously warm again.	Ammonia **one mark** Test for ammonia described **one mark**	NO_3^- or NO_2^- **one mark**	**3**
(d)	To 2 cm depth of **FC 3** in a test-tube, add aqueous potassium iodide.	Yellow precipitate **one mark**	Pb^{2+} **one mark**	**2**
(e)	To 2 cm depth of **FC 3** in a boiling-tube, add dilute aqueous ammonia until in excess. Filter the mixture and then add dilute nitric acid drop by drop to neutralise the solution and then in excess.	White precipitate. **one mark** White precipitate. Soluble or partially soluble (excess). **one mark** *(from both observations)*	*Ignore any ions from white precipitate* Zn^{2+} **one mark**	**3**

Give **one mark** if all three ions are correctly identified in the summary:

Summary **FC 3** contains the cations Pb^{2+} and Zn^{2+} and the anion NO_3^- **1**

Total of 15 scoring points

If the mark is in excess of **10** cross through the mark and record **10 max.**

Total for Question 2 is 10 and for the Paper 25.