UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

General Certificate of Education O Level

MARK SCHEME for the November 2004 question paper

5070 CHEMISTRY

5070/03 **Paper 3 (Practical Test), maximum mark 40**

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

- CIE will not enter into discussion or correspondence in connection with these mark schemes.

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UNIVERSITY of CAMBRIDGE
International Examinations

NOVEMBER 2004

GCE O Level

MARK SCHEME

MAXIMUM MARK: 40

SYLLABUS/COMPONENT: 5070/03

CHEMISTRY
Paper 3 (Practical Test)

UNIVERSITY of CAMBRIDGE
International Examinations

1 (a) Titration 12 marks

Accuracy 8 marks

These marks are given using any of the candidate's values not just ticked ones.

For the two best titres give:

4 marks for a value within 0.2 cm^3 of supervisor

2 marks for a value within 0.3 cm^3 of supervisor

1 mark for a value within 0.4 cm^3 of supervisor

If candidates' or supervisors' results are given to 2 decimal places take to the nearest 0.1 cm^3.

If halfway, round up or down so as to favour the candidate.

Concordance 3 marks

These are based on all the values ticked by the candidate (not just those chosen for the accuracy marks) and are independent of the accuracy marks.

Give:

3 marks if all ticked values are within 0.2 cm^3

2 marks if all ticked values are within 0.3 cm^3

1 mark if all ticked values are within 0.4 cm^3

To score any concordance mark at least two of the ticked values must be within **0.6 cm^3** of the Supervisor's value.

If the candidate ticks only one value, or none at all, then see the notes on the next page.

Average 1 mark

Give 1 mark if the candidate calculates a correct average (error not greater than 0.05) of all his ticked value.

If the candidate ticks only one value, or none at all, then see notes on the next page.

If the majority of candidates are not scoring at least 6 out of 8 for accuracy, it may be necessary to consider awarding the accuracy marks based on a 'candidate average' rather than the Supervisor's value.

Assuming a 25 cm^3 pipette and a titre of 24.6 cm^3

(b) Concentration of MIO_3, in mol/dm^3 2 marks

conc of MIO_3 = $\frac{24.6 \times 0.1}{25.0 \times 6}$ (1)

= 0.0164 (correct to 0.0001) (1)

Allow 0.016 for 0.0160 etc., answers should be correct to + or – 1 in the third significant figure.

Candidates who work out, and write down, the answer to the correct number of significant figures, but in the answer line use fewer figures are not penalised at this stage.

(c) M_r of MIO_3 **1 mark**

= 3.30/0.0164

= 20 (1)

(d) A_r of M **1 mark**

= 201 – (127 + 48)

= 26 (1)

(e) Identity of M **1 mark**

M is sodium (1)

The metal must be the closest metal which forms a + 1 ion

Mark the calculations consequentially throughout even if it produces an impossible result.

In **(c)** and **(d)** give the mark for the method, ignore evaluation.

17 marks for Question 1

Question 2 **23 marks**

R is nickel sulphate, **S** is copper sulphate, **T** is cobalt nitrate

R/Nickel	**S/Copper**	**T/Cobalt**	General points
NaOH	NaOH	NaOH	
green ppt (1) ignore shades of green blue/green	blue ppt (1) allow any shade of blue blue/green (0)	blue ppt (1) allow any shade of blue	both colour and ppt required allow solid, suspension, powder do not allow substance, particles, deposit, residue, sediment, gelatinous, insoluble etc.
+ *excess* ppt insoluble (1)	ppt insoluble (1)	ppt insoluble (1) ppt turns pink/or grey (1) pink ppt (2)	no change, to score this mark, the candidates must have a ppt (any colour) in (a) partially soluble, partially insoluble scores (0)
+ H_2O_2 effervesces (1) gas relights glowing splint (1) oxygen produced (1)	effervesces (1) forms a black ppt/brown ppt colour change must be linked to ppt. *	effervesces (1) forms a brown ppt * (1)	fizzes etc., gas <u>vig</u> evolved effervesces scores each time but the oxygen test scores only one. Allow even if other gases identified to score conclusion mark, test must be at least partially correct (i.e. relights a burning splint)

R/Nickel	S/Copper	T/Cobalt	General points
NH_3			
green or blue ppt (1)	blue ppt (1)	green or blue ppt (1)	
excess soluble in excess (1) blue solution (1)	soluble in excess (1) blue solution (1)	insoluble in excess (1)	if no ppt with Ni^{2+} or Cu^{2+} allow blue solution (Ni^{2+}) dark blue solution (Cu^{2+}) 1 mark for each
$Ba(NO_3)_2$			
white ppt (1) *+ acid* ppt insoluble	both white and ppt required		
$AgNO_3$			
no reaction (1)	no ppt, no change etc. any implication of a reaction in either part loses the mark		

Conclusions **1 mark**

the anion is a sulphate or SO_4^{2-} whites ppt in Test 3 which does not dissolve in acid and no ppt in Test 4

any 23 marks to score 25 scoring points