#### 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

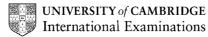
This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking 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.

CIE is publishing the mark schemes for the November 2004 question papers for most IGCSE and GCE Advanced Level syllabuses.



**NOVEMBER 2004** 

GCE O Level

MARK SCHEME

MAXIMUM MARK: 40

## SYLLABUS/COMPONENT: 5070/03

CHEMISTRY Paper 3 (Practical Test)



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#### 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 <sup>3</sup> of supervisor
2 marks	for a value within 0.3 cm <sup>3</sup> of supervisor
1 mark	for a value within 0.4 cm <sup>3</sup> of supervisor

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

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 <sup>3</sup>
2 marks	if all ticked values are within 0.3 $\mbox{cm}^3$
1 mark	if all ticked values are within 0.4 cm <sup>3</sup>

To score any concordance mark at least two of the ticked values must be within  $0.6 \text{ cm}^3$  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.

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Assuming a 25 cm<sup>3</sup> pipette and a titre of 24.6 cm<sup>3</sup>

**(b)** Concentration of  $MIO_3$ , in mol/dm<sup>3</sup> 2 marks

conc of MIO<sub>3</sub> = 
$$\frac{24.6 \times 0.1}{25.0 \times 6}$$
 (1)

 $= 0.0164 \text{ (correct to 0.0001)} \tag{1}$ 

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) $M_{\rm r}$ of MlO <sub>3</sub>	1 mark				
	=	3.30/0.0164			
	=	20	(1)		
(d) A <sub>r</sub> of M	1 mar	k			
	=	201 – (127 + 48)			
	=	26	(1)		
(e) Identity of M	1 mar	k			
	M is s	odium	(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

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

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R/Nickel		S/Copper		T/Cobalt		General points
NH <sub>3</sub>						
green or blue ppt	(1)	blue ppt	(1)	green or blue ppt	(1)	
excess		soluble in excess	(1)	insoluble in excess	(1)	if no ppt with Ni <sup>2+</sup> or Cu <sup>2+</sup> allow blue solution (Ni <sup>2+</sup> ) dark blue
soluble in excess	(1)	blue solution	(1)			solution ( $Cu^{2+}$ )
blue solution	(1)					1 mark for each
Ba(NO <sub>3</sub> ) <sub>2</sub>						
white ppt	(1)	both white and ppt required				
+ acid						
ppt insoluble						
AgNO <sub>3</sub>						
no reaction	(1)	no ppt, no change etc.				
		any implication of a reacti	on in eithe	er 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				