UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2007 question paper

5070 CHEMISTRY

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

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

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.

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1 16 marks

(a) titration

Accuracy [8]

for each of 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

Concordance [3]

Give:

3 marks if all the ticked values are within 0.2 cm^3
2 marks if all the ticked values are within 0.3 cm^3
1 mark if all the ticked values are within 0.4 cm^3

Average [1]

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

Assuming a 25 cm^3 pipette and a titre of 24.0 cm^3

(b) concentration of iron(II) sulphate in mol/dm^3

$$\text{conc} = \frac{24.0 \times 0.020 \times 5}{25.0}$$ [1]

= 0.0960 (correct to 0.0001) [1]

Allow 0.1 for 0.100 etc., answers should be correct to ±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) mass of iron

mass = 0.0960 × 56 = 5.38 [1]

(d) % of iron

% = (5.38/6.00) × 100 = 89.6 % [1]

Mark consequentially throughout. All answers are required to three significant figures but penalise over approximation only once

2 24 marks

R is calcium chloride, **S** is zinc sulphate, **T** is lead(II) nitrate

Tests on **R**		
Test 1	**2 marks**	
	white ppt.	
	insoluble in excess	[1]
Test 2	**2 marks**	
	no reaction initially	[1]
	white ppt. on standing	[1]
Test 3	**3 marks**	
	white ppt.	[1]
	soluble in excess	[1]
	colourless solution	[1]
Test 4	**1 mark**	
	white ppt	[1]

Tests on **S**		
Test 1	**3 marks**	
	white ppt.	[1]
	soluble in excess	[1]
	colourless solution	[1]
Test 2	**1 mark**	
	no reaction	[1]
Test 3	**1 mark**	
	no reaction	[1]
Test 5	**1 mark**	
	white ppt.	[1]

Tests on **T**		
Test 1	**3 marks**	
	white ppt.	[1]
	soluble in excess	[1]
	colourless solution	[1]
Test 2	**1 mark**	
	white ppt.	[1]
Test 3	**3 marks**	
	white ppt.	[1]
	soluble in excess	[1]
	colourless solution	[1]

Conclusions **4 marks**

The anion in **R** is Cl^-	(white ppt. required in Test 4 with **R**)	[1]
The anion in **S** is SO_4^{2}	(white ppt. required in Test 5 with **S**)	[1]
Any two of:		
The cation in **R** is Ca^{2+}	(white ppt. insoluble in excess NaOH required in Test 1 with **R**)	[1]
The cation in **S** is Zn^{2+} or Al^{3+}	(white ppt. soluble in excess NaOH required in Test 1 with **S**)	[1]
The cation in **T** is Pb^{2+}	(white ppt. soluble in excess NaOH required in Test 1 with **T and** white ppt. in Test 2)	[1]

Any **24** marks to score.