UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 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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International Examinations

1 (a) Titration

Accuracy 10 marks

For the two best titres give:
- 5 marks for a value within 0.2 cm^3 of supervisor
- 3 marks for a value within 0.3 cm^3 of supervisor
- 2 marks for a value within 0.4 cm^3 of supervisor
- 1 mark for a value within 0.5 cm^3 of supervisor

Concordance 3 marks

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 mark

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

[14]

(b) Assuming a 25 cm^3 pipette and a titre of 24.6 cm^3

Concentration of hydrochloric acid, in mol/dm^3

$$\text{conc} = \frac{25.0 \times 0.1}{24.6} \quad (1)$$

= 0.102 (correct to 0.001) (1) [2]

(c)(d) R + P

Effervesces (bubbles etc) (1)

Turns limewater milky etc. (1)

Carbon dioxide evolved (1)

Colourless or clear solution remains or partially soluble or some dissolves (1)

$ZnCO_3$ circled or indicated (1)
Carbon dioxide named or tested for (with limewater) or effervesces etc. [5]

Question 2

S is $Cu(NH_3)_4SO_4$ [23]

Test	Notes
General points For ppt allow solid, suspension, powder For gases Name of gas requires test to be at least partially correct. Effervesces = bubbles = gas vigorously evolved (but not just gas evolved) Solutions Colourless not equivalent to clear, clear not equivalent to colourless	
Test 1 **4 marks** Blue ppt (1) Turns black (1) Gas turns litmus blue (1) Ammonia (1)	 Allow shades of blue here and elsewhere. Allow blue/green here but not elsewhere (for ppts) Allow brown, no need to link to solid, allow brown 'stain' etc. Allow turns litmus blue (without gas) if ammonia mentioned, fumes with HCl
Test 2 **4 marks** Blue ppt (2) Soluble in acid (1) Blue solution (1)	 Give one mark for ppt of whatever colour. Mixed coloured (white ppt + blue ppt) do not score the colour mark here or in Test 3 Allow green but not colourless Allow paler blue solution even if ppt remains
Test 3 **4 marks** White ppt (2) Insoluble in acid (1) Solution becomes colourless (1) or paler	 Give one mark for ppt of whatever colour. Allow pale blue but not blue unless solution earlier is dark blue

Test 4 **9 marks**	
No initial reaction with KI (1)	Allow slight colour change but not (turns) blue Any implication of a reaction effervesces loses this mark
+ acid White ppt (2)	Give one mark for a ppt of any colour. Give the colour of ppt mark for anything than is paler/yellower than brown. Ignore the order in which the colours appear and mixed colours. Not orange for colour of ppt
Yellow or brown solution (1)	Both colour and solution required if ppt mentioned but turns yellow/brown (1) if nothing else in part (b), allow orange for solution
+ thiosulphate White ppt (1)	Allow pale pink, pale lilac for white
Solution is now colourless (1)	
Ppt dissolves(1) Colourless solution (1)	Forms a colourless solution (2)
White ppt reforms (1)	Allow any pale colour ppt or even turns cloudy/milky or white solution at this stage i.e. after the earlier white ppt has dissolved
Conclusion **2 marks**	
Allow any two of	
Cu^{2+} or copper(II) (1)	
SO_4^{2-} or sulphate (1)	Ppt of any colour in Test 3
NH_4^{+}or ammonium (1)	Ammonia named or tested for in Test 1