

MARK SCHEME for the May/June 2008 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.

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

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Page 2	Mark Scheme	Syllabus	Paper
	GCE O LEVEL – May/June 2008	5070	03

1 (a) Identification of the acid

Test 1 1 mark	White ppt (1)	See Question 2 for acceptable alternatives
Test 2 1 mark	No reaction (1)	Allow solution stays colourless or clear
Test 3 1 mark	White ppt (1)	
Conclusion 1 mark	Acid is sulphuric acid (1)	

[4]

(b) Titration

Accuracy (8 marks)

For each of the two best titres give:

- 4 marks for a value within 0.2 cm³ of supervisor
- 2 marks for a value within 0.3 cm³ of supervisor
- 1 mark for a value within 0.4 cm³ of supervisor

If candidates' or supervisors' results are given to 2 decimal places take to the nearest 0.1 cm³.
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 the ticked values are within 0.2 cm³
- 2 marks if all the ticked values are within 0.3 cm³
- 1 mark if all the ticked values are within 0.4 cm³

To score any concordance mark at least two of the ticked value must be within **0.6 cm³** of the Supervisor's value.

Average (1 mark)

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

[12]

Page 3	Mark Scheme	Syllabus	Paper
	GCE O LEVEL – May/June 2008	5070	03

Assuming a 25 cm³ pipette and a titre of 24.6 cm³

(c) Concentration of sulphuric acid, in mol/dm³

$$\text{conc} = \frac{25.0 \times 0.1}{24.6 \times 2} \quad (1)$$

$$= 0.0508 \text{ (correct to 0.0001)} \quad (1)$$

Allow 0.05 for 0.0500 etc, answers should be correct to + or – 1 in the third significant figure.

If the acid has been identified as hydrochloric acid, allow correct calculation using a mole ratio of 1:1 to score without penalty. [2]

- 2 **S** is FeCl₃
R is CuSO₄
U is NiSO₄

General points

For ppt

allow solid, suspension, powder

do not allow substance, particles, deposit, residue, sediment, gelatinous, insoluble etc.

do not allow cloudy/milky etc for ppt forms but do allow cloudy/milky remains or clears for ppt remains or dissolves.

For gases

Name of gas requires test to be at least partially correct.

Effervesces = Bubbles = gas vigorously evolved but not gas evolved

Solutions

Colourless not equivalent to clear, clear not equivalent to colourless

	Tests on S	Tests on T	Tests on U
Test 1 6 marks	Brown ppt (1) allow red/brown do not allow red or orange Insoluble in excess (1)	Blue ppt (1) Insoluble in excess (1)	Green ppt (1) Insoluble in excess (1)
Test 2 8 marks	Brown ppt (1) see Test 1 Insoluble in excess (1)	Blue ppt (1) Soluble in excess (1) Blue solution (1) Give one mark for final dark blue solution if no initial ppt seen	Blue ppt (1) Soluble in excess (1) Blue solution (1) Give one mark for final blue solution if no initial ppt seen

Page 4	Mark Scheme	Syllabus	Paper
	GCE O LEVEL – May/June 2008	5070	03

Test 3 5 marks	Solution becomes redder (1)	White ppt (2) Give 1 mark for a ppt of any colour. Allow any colour paler than brown for the colour mark. Brown solution (1) Allow yellow or orange for colour of the solution.	No reaction (1)
Test 4 2 marks	No reaction (1) Ignore slight change in colour i.e. becomes paler yellow	White ppt (1) Allow only white	
Test 5 2 marks	White ppt (1) Allow only white	No reaction (1) Ignore slight change in colour i.e. becomes paler blue	
Conclusion 2 marks	S is FeCl_3	R is CuSO_4	

Conclusion marks require the tests for the individual ions to be at least partially correct and ppts with only barium nitrate or silver nitrate not both.

Any 22 marks to score.

[22]
[Total: 40]