

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
GCE Advanced Subsidiary Level and GCE Advanced Level

**MARK SCHEME for the May/June 2012 question paper**  
**for the guidance of teachers**

**9701 CHEMISTRY**

**9701/32**

Paper 32 (Advanced Practical Skills 2),  
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, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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

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Page 3	Mark Scheme: Teachers' version	Syllabus	Paper
	GCE AS/A LEVEL – May/June 2012	9701	32

Question	Sections	Indicative material	Mark
(d)	PDO layout	<b>I</b> Rate on y-axis and volume on x-axis. Axes clearly labelled	1
		<b>II</b> Linear scale chosen to use at least half of each axis (need not include 0,0) If no point at 0, 0 cannot count for > half.	1
		<b>III</b> Plotting of points. Minimum of 3 readings.	1
		<b>IV</b> Draws a line of best fit. Minimum of 4 readings including 0, 0 (if plotted).	1
(e)	ACE conclusion	Rate is (directly) proportional to $\text{Fe}^{3+}$ concentration. Rate increases as concentration (volume) increases would score one	2 [2]
(f)	ACE	(i) $2 \times 0.05 / 0.1$  $0.10 / 20.00 \times 100 = 0.5\%$ 0.25 scores 1 mark. No ecf.	1 1
	ACE improvement	(ii) Difficult to judge colour change / measurement of reaction time / some thiosulfate reacting with acid / formation of (S) ppt / variation in T.	1
		(iii) Investigate reaction between $\text{Fe}^{3+}$ and $\text{S}_2\text{O}_3^{2-}$	1 [4]
(g)	ACE conclusion	(ii) Thiosulfate concentration / number of moles / volume is halved (1) Time is shorter / reaction is faster with less thiosulfate (1) ora.	2 [2]
			<b>[Total: 26]</b>

Page 4	Mark Scheme: Teachers' version	Syllabus	Paper
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Question	Sections	Indicative material			Mark
FB 5 = H <sub>2</sub> SO <sub>4</sub> ; FB 6 = K <sub>2</sub> CrO <sub>4</sub> ; FB 7 = BaCl <sub>2</sub> ; FB 8 = Pb(NO <sub>3</sub> ) <sub>2</sub> ; FB 9 = NaNO <sub>2</sub>					
2 (a)	MMO collection	Orange solution (1)	White ppt and (white ppt in RH column)	White ppt (1)	[5]
			Yellow/cream ppt (1)	Yellow ppt (1)	
				White ppt (1)	
Ignore excess of any reagent.					
(b)	ACE conclusion	Pb <sup>2+</sup> in FB 8 AND Ba <sup>2+</sup> in FB 7  H <sup>+</sup> in FB 5 AND CrO <sub>4</sub> <sup>2-</sup> in FB 6  SO <sub>4</sub> <sup>2-</sup> in FB 5 AND Cl <sup>-</sup> in FB 7			1  1  1  [3]
(c)	MMO decision	I Warms with NaOH and Al in (i).			1
	MMO decision	II Adds named (dilute) acid in (ii).			1
	PDO recording	III Presents observations in a single table – no extra reagents in (iii).			1
	MMO collection	IV Ammonia / gas turns litmus blue in (iii). If ammonia mentioned first, assume it is the gas that affects the litmus.			1
	MMO collection	V Brown fumes (of NO <sub>2</sub> ) / gas that turns blue litmus red in (iii).			1
	ACE conclusion	VI nitrite (needs evidence).			1 [6]
					[Total: 14]