
International A-Level Chemistry

CH05 – Unit 5: Practical and synoptic

Mark scheme

9620

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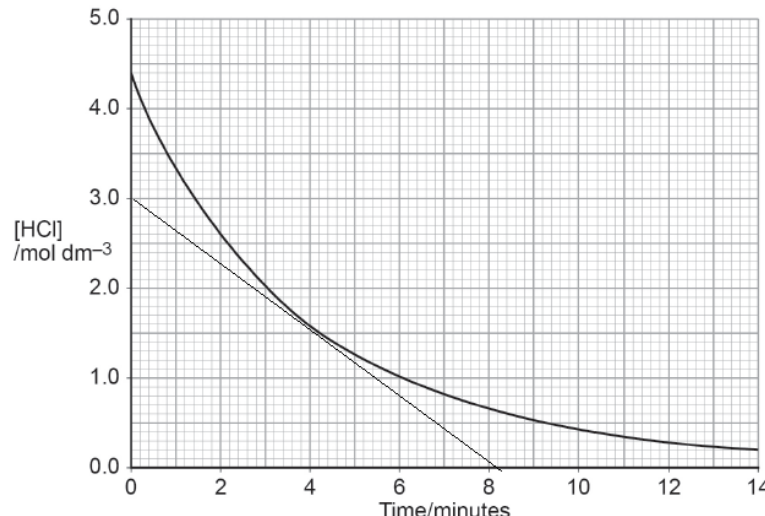
Version/Stage: 1.1 Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Question	Marking guidance	Mark	Comments
01.1	(propanoic acid) Add magnesium or sodium hydrogen carbonate or named carbonate	1	Accept any named indicator and correct observation
	effervescence	1	
	(butanal) Tollens' reagent or Fehling's/Benedict's reagent	1	Allow 2,4-DNPH
	silver mirror or red precipitate	1	orange precipitate
	(pentan-1-ol) Acidified potassium dichromate	1	
	turns green	1	
01.2	$\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + \text{CH}_3\text{CH}_2\text{COOH}$ $\rightarrow \text{CH}_3\text{CH}_2\text{COOCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3 + \text{H}_2\text{O}$	1	Do not allow molecular formula in equations eg $\text{C}_5\text{H}_{11}\text{OH}$
	sweet or fruity smell or oily layer	1	
	pentyl propanoate	1	
	Total	9	

Question	Marking guidance	Mark	Comments
02.1	$n(\text{NaOH}) = (11.50 \times 10^{-3} \times 0.255)$ $= 2.93 \times 10^{-3} \text{ mol}$	1	Must be 3 significant figures
	$[\text{HCl}] = 2.93 \times 10^{-3} \div 5.00 \times 10^{-3}$ $= 0.587 \text{ (mol dm}^{-3}\text{)}$	1	
		1	
02.2	tangent drawn at $t = 4.0$ minutes	1	Accept tangent drawn between y and x axes
	tangent is of reasonable length (and right-angled triangle drawn)	1	
	 gradient calculated (eg $3.0 \div 8.2 = 0.37 \text{ (mol dm}^{-3} \text{ min}^{-1}\text{)}$)	1	

02.3	$rate = k[ROH][HCl]$	1	
02.4	calculated value of $[HCl]$ would be double the correct value	1	
02.5	$k (= 0.562 \div 0.107) = 5.25$ min^{-1}	1	
		1	
02.6	(mechanism 2) because the slow step involves only ROH / does not involve H_2O and the reaction is zero order with respect to H_2O	1	If mechanism 1 CE = 0/2 Accept rate-determining step in place of slow step
		1	
	Total	12	

Question	Marking guidance	Mark	Comments
03.1	It has mobile ions or ions can move through it or free ions	1	Do not allow electrons
03.2	Chloride ions react with copper(II) ions / Cu^{2+} OR $[\text{CuCl}_4]^{2-}$ formed	1	Allow reacts with the metal ions in the solution
03.3	(eventually) the Cu^{2+} ions / CuSO_4 in each electrode will be at the same concentration	1	
03.4	$\text{Mn} \mid \text{Mn}^{2+} \parallel \text{Cu}^{2+} \mid \text{Cu}$ (+) 1.52 V	1	Ignore state symbols
		1	
03.5	Zn^{2+} because iron (filings) cannot reduce Zn^{2+} ions OR because the half-reaction involving $\text{Zn}^{2+} / \text{Zn}$ has a more negative $E^\ominus$ value than the one involving Fe	1 1	Allow $E^\ominus \text{Zn}^{2+} (/ \text{Zn}) < E^\ominus \text{Fe}^{2+} (/ \text{Fe})$

03.6	$\text{Cu}^{2+}(\text{aq}) + \text{Fe}(\text{s}) \rightarrow \text{Cu}(\text{s}) + \text{Fe}^{2+}(\text{aq})$	1	State symbols not required
	$2\text{Fe}^{3+}(\text{aq}) + \text{Fe}(\text{s}) \rightarrow 3\text{Fe}^{2+}(\text{aq})$	1	Award 2 marks for $\text{Cu}(\text{s}) + 2\text{Fe}^{3+}(\text{aq}) \rightarrow \text{Cu}^{2+}(\text{aq}) + 2\text{Fe}^{2+}(\text{aq})$
	Total	9	

Question	Key
4	C
5	C
6	D
7	D
8	B
9	B
10	B
11	D
12	D
13	C
14	D
15	B
16	D
17	C
18	B
19	B
20	C
21	B
22	B
23	C
24	C
25	B
26	C
27	A
28	D
29	D
30	C
31	D
32	D
33	D