

CHEMISTRY

9701/51 October/November 2017

Paper 5 Planning, Analysis and Evaluation MARK SCHEME Maximum Mark: 30

Published

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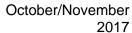
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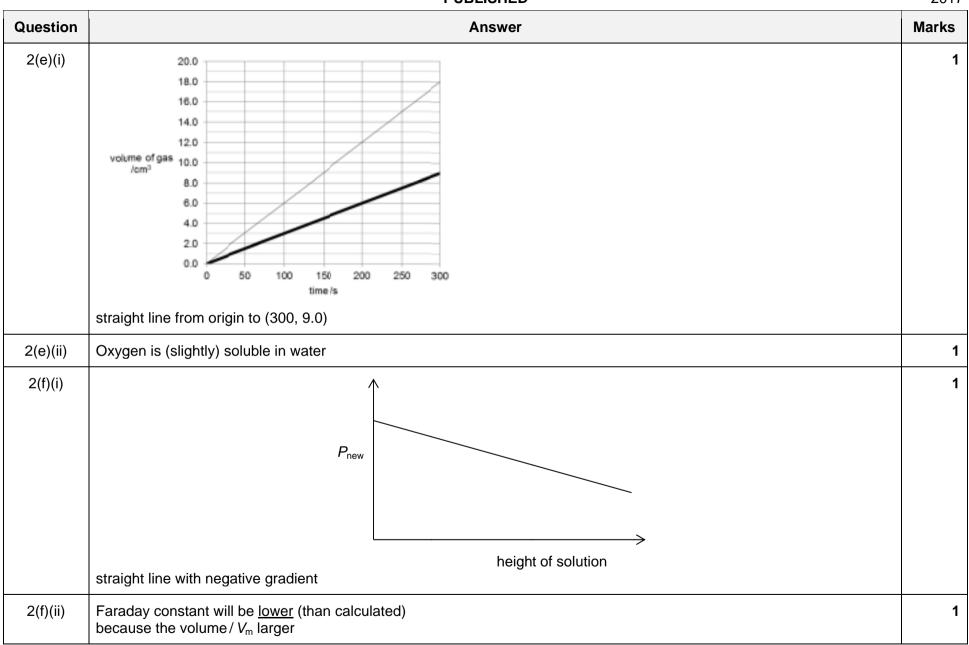
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Question	on Answer				
1(a)(i)	mass = $228.2 \times 1.00 \times (250/1000)$ = 57.1 g	1			
1(a)(ii)	Distilled/deionised water must be mentioned somewhere for 2 marks to be given. Dissolve (all) the solid in a (suitable container) with (distilled) water	1			
	Transfer / add to a 250 cm ³ volumetric flask AND make to mark with (distilled) water	1			
1(a)(iii)	(starch) gives a sharp 'end-point'/turns blue sharply / goes blue with volume of ${ m I_2}$ invisible to naked eye				
1(b)	volumes of $(NH_4)_2S_2O_8(aq)$ constant	1			
	volumes of I ⁻ varying with range	1			
	total volume constant, made up by water	1			
1(c)(i)	mol I ₂ (aq) = $V(S_2O_3^{2-}) \times [S_2O_3^{2-}]/2$	1			
	$= \left(\frac{0.005 \times 0.0050}{2}\right) = 1.25 \times 10^{-5}$				
	$[I_2(aq)] = \frac{\text{moles of } I_2(aq)}{V_{\text{total}}} = \frac{1.25 \times 10^{-5}}{0.021} = 5.95 \times 10^{-4}$	1			
	rate = $[I_2(aq)]/time$	1			
	$=\frac{5.95\times10^{-4}}{134} = 4.44\times10^{-6}$				
1(c)(ii)	repeat the experiment (and take average)	1			
1(c)(iii)	% error= $\frac{2 \times 0.05}{5.0} \times 100\% = 2(.0)\%$	1			

Question	Answer	Marks
1(d)	No thiosulfate had been added	1
1(e)	Ammonium persulfate must be stated along with its hazard and linked to the precaution.	1
	Ammonium persulfate is a skin irritant so wear gloves OR Ammonium persulfate is an irritant to the respiratory system; do the experiment in fume cupboard/face mask	
	OR Ammonium persulfate is harmful if swallowed so avoid mouth contact/wear face mask	
	OR Ammonium persulfate is oxidising so avoid contact with flammable/combustible materials.	
	OR Ammonium persulfate is harmful/hazardous to the environment so do not dispose of down the drain/use (large quantities) of water to dilute before disposal	

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Question	Answer				Marks	
2(a)	time /s	burette volume (of reading hydrogen) /C /C				
	0	46.20	0.00	0		
	50	41.20	5.00	40		
	100	36.20	10.00	80		
	150	31.45	14.75	120		
	200	25.80	20.40	160		
	250	20.80	25.40	200		
	300	16.40	29.80	240		
	350	11.45	34.75	280		
	400	6.80	39.40	320		
	450	1.50	44.70	360		
	volumes of hy charge correct	/drogen correct ct	to 2 d.p.			
2(b)	All ten points plotted correctly					
	Best-fit straig	ht line drawn				
2(c)	Yes, (the data is reliable because) most of the points are on the line OR only a few points are not on the line.					
2(d)(i)	co-ordinates read and recorded correctly					
	gradient deter	rmined				
2(d)(ii)	= (i) ÷ 24000					
2(d)(iii)	= 1 ÷ (2 × (ii))					





Question	Answer	Marks				
2(g)	No effect at cathode	1				
	Less gas produced at anode					
	Copper anode will dissolve/is (an) active (anode) OR copper has lower/more negative E ^e	1				