CAMBRIDGE INTERNATIONAL AS & A LEVEL CHEMISTRY · 9701

CHEMISTRY



MARK SCHEME

6 ELECTROCHEMISTRY

SCORE	PERCENTAGE
/	%

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Paper 1 Multiple Choice Answers: Electrochemistry

Question	Paper	Q. No.	Answer
281	9701_m22_qp_12	10	A
282	9701_m21_qp_12	8	C
283	9701_s21_qp_11	9	D
284	9701_s21_qp_12	9	A
285	9701_w21_qp_11	9	C
286	9701_w21_qp_12	10	D
287	9701_m20_qp_12	5	D
288	9701_m20_qp_12	10	D
289	9701_s20_qp_11	2	C
290	9701_s20_qp_11	8	B
291	9701_s20_qp_12	5	D
292	9701_s20_qp_12	10	B
293	9701_s20_qp_13	10	C
294	9701_w20_qp_11	8	A
295	9701_w20_qp_11	9	B
296	9701_w20_qp_12	1	A
297	9701_w20_qp_12	9	C
298	9701_m19_qp_12	10	B
299	9701_s19_qp_11	9	B
300	9701_s19_qp_12	9	C
301	9701_s19_qp_13	1	D
302	9701_s19_qp_13	8	A
303	9701_w19_qp_11	6	A
304	9701_w19_qp_11	9	D
305	9701_w19_qp_12	8	C
306	9701_w19_qp_12	15	C
307	9701_m18_qp_12	10	D
308	9701_m18_qp_12	11	C
309	9701_m18_qp_12	12	B
310	9701_s18_qp_11	8	A
311	9701_s18_qp_11	9	B
312	9701_s18_qp_12	8	D
313	9701_s18_qp_13	8	D
314	9701_w18_qp_11	7	B
315	9701_w18_qp_11	8	C
316	9701_w18_qp_12	8	B
317	9701_m17_qp_12	8	A
318	9701_s17_qp_11	8	C
319	9701_s17_qp_11	9	B
320	9701_s17_qp_12	8	C
321	9701_s17_qp_13	4	B
322	9701_s17_qp_13	7	A
323	9701_s17_qp_13	8	B
324	9701_w17_qp_11	6	A
325	9701_w17_qp_12	8	D
326	9701_m16_qp_12	1	A

Paper 1 Multiple Choice Answers: Electrochemistry (continued)

Question	Paper	Q. No.	Answer
327	9701_s16_qp_12	9	C
328	9701_s16_qp_12	17	C
329	9701_w16_qp_11	3	D
330	9701_w16_qp_11	9	A
331	9701_s15_qp_11	4	B
332	9701_s15_qp_12	10	A
333	9701_s15_qp_13	5	C
334	9701_s15_qp_13	16	D
335	9701_w15_qp_11	19	A
336	9701_w15_qp_12	5	D

23. 9701_s20_ms_21 Q: 2

(a)(i)	$2CuSO_4(aq) + 4KI(aq) \rightarrow 2CuI(s) + (1)I_2(aq) + 2K_2SO_4(aq)$ **M1** correct balancing **M2** correct state symbols	**2**
(a)(ii)	Oxidation state of copper in $CuSO_4$ (+)2 AND Oxidation state of copper in CuI (+)1	**1**
(a)(iii)	**M1** redox	**1**
	M2 iodide ions – lost electron(s) AND copper ions – gained electron(s)	**1**
(b)	Mass of 0.0982mol $CuSO_4$ in 17.43g $CuSO_4.\mathbf{y}H_2O$ → **M1** *calculate M_r $CuSO_4$ using Ar from data booklet* 63.5 + 32.1 + 64.0 = 159.6 **M2** *use Mr to calculate mass of $CuSO_4$* (0.0982 × M1) =15.67272g	**4**
	number of water in 17.43g of $CuSO_4$ $\mathbf{y}H_2O$ → **M3** *calculate the mass amount of water in sample AND use this value to calculate the amount of water present* (17.43-15.67)/18 = 0.097778 mol	
	value of **y** → **M4** *use the ratio of M2: 0.0982 to find y* (mol H_2O ÷ mol $CuSO_4$) = 1	

24. 9701_s19_ms_23 Q: 2

(a)(i)	held in regular / uniform arrangement	**1**
(a)(ii)	**M1** covalent (bonds) AND (temporary) induced dipoles **M2** (temporary) induced dipoles	**2**
(b)(i)	2	**1**
(b)(ii)	iodine (atom / s) donates a pair of electrons (to the A*l*-I covalent bond / s).	**1**
(c)(i)	$2H_2SO_4 + 14HI \rightarrow 7I_2 + 8H_2O + H_2S + S$ **M1** correct species **M2** correctly balanced equation	**2**
(c)(ii)	*explain with ref to ox no's why the reaction in **(c)(i)** is a redox reaction* **M1** I (oxidation number increases) from –1 to 0 = oxidation / reducing agent **M2** S (oxidation number decreases) from (+) 6 to 0 **OR** –2 = reduction / oxidising agent	**2**

25. 9701_s16_ms_22 Q: 3

(a)	$Cr_2O_7^{2-} + 8H^+ + 3H_2C_2O_4 \rightarrow 2Cr^{3+} + 6CO_2 + 7H_2O$ M1 = species M2 = balancing	 [1] [1]
(b) (i)	(0.02 × 32.0/1000 =) 6.40×10^{-4}	[1]
(ii)	($6.4 \times 10^{-4} \times 3$ =)1.92×10^{-3}	[1]
(iii)	(0.242 / 1.92×10^{-3} =) 126(.0)	[1]
(iv)	(126 – 90 = 36; 36 / 18 = 2 hence) $x = 2$	[1]