Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/51**

Paper 5 Practical Test **October/November 2016**

MARK SCHEME

Maximum Mark: 45

Published

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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Question	Answer	Mark
1(a)	time / minutes ; (beaker) **A** and (beaker) **B** / water and iodine solution ;	**2**
1(b)(i)	initial observation for **both** as cloudy / colourless / milky / white ;	**1**
1(b)(ii)	full set of results for both beakers ; beaker **A** – no change to observation ; beaker **B** – observation changes to blue-black / black ;	**3**
1(c)	iodine (molecules) move into bag ; by diffusion / because molecules are small enough ; starch and iodine produce blue-black / black / darker colour ;	**3**
1(d)	control / to show effect of water / to show effect without iodine ;	**1**
1(e)(i)	(blue-black) colour goes / colour fades / goes brown / goes orange / goes yellow ;	**1**
1(e)(ii)	no starch left / no starch – iodine complex ;	**1**
1(e)(iii)	Benedict's solution ; heat / hot water bath ; green / yellow / orange / red ;	**3**
	Total:	**15**

Question	Answer	Mark
2(a)	**cation** add sodium hydroxide solution / NaOH **AND** green ppt. ; (ALLOW gas changes red litmus to blue) iron(II) / Fe^{2+} ; (DO NOT ALLOW ammonium if alternative observation given because ammonium given in question) **anion** add barium nitrate (solution) / $Ba(NO_3)_2$ **AND** white ppt. ; ALLOW barium chloride sulfate / SO_4^{2-} ;	**4**
2(b)(i)	colourless solution ; fizzing / bubbles / effervescence ; lighted splint pops ; hydrogen / H_2 (depends on use of splint) ;	**4**
2(b)(ii)	white ppt. ; ppt. dissolves / <u>becomes</u> colourless solution ; (element **L** is) zinc / Zn ; independent mark	**3**
2(c)(i)	observations: effervescence / bubbles / fizzing / gets hot ; filtrate: colourless / <u>paler</u> green ;	**2**
2(c)(ii)	white ppt. / faint ppt. / milky / no ppt. ;	**1**

Question	Answer	Mark
2(d)	displacement / redox / cation reduced / Fe^{2+} goes to Fe / Fe^{2+} disappears / (cation) reacted ;	1
	Total:	15

Questions	Answer	Mark
3(a)(i)	l present to the nearest millimetre AND 60.0 ± 0.2 ;	1
3(a)(ii)	appropriate precaution (**either written or shown on diagram**): take reading at eye level / use of set square to ensure rule vertical / use of fiducial aid / place ruler close to pendulum ;	1
3(b)(i)	time recorded to 1 decimal place ; sensible time = 31 s $\pm$ 0.5 (accuracy mark) ;	2
3(b)(ii)	time recorded and less than that in **(i)** ;	1
3(b)(iii)	all time values recorded with pattern of decreasing times ;	1
3(c)(i)	T values calculated correctly (ignore no. of decimal places) ;	1
3(c)(ii)	complete set of T^2 values recorded, correctly rounded to 1 decimal place ;	1
3(d)(i)	suitable choice of scales (more than half the grid used) AND from (0,0) ; at least 4 plots correct to ½ small square ; good best-fit straight line judgement ;	3
3(d)(ii)	triangle method indicated on graph AND more than half the line used ; correct calculation from graph ;	2
3(e)	9.8 $\pm$ 0.3 (accuracy mark) ;	1

Question	Answer	Mark
3(f)	yes agree – values close enough allowing for **experimental error** OR no disagree – difference too large to be attributed to **experimental error** ;	**1**
	Total:	**15**