PHYSICAL SCIENCES **8780/04**

Paper 4 Advanced Practical Skills **October/November 2017**

MARK SCHEME

Maximum Mark: 30

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	Marks
1(a)	one voltmeter reading positive AND the other negative	**1**
1(b)(i)	($L =$) 30 ± 10 (cm)	**1**
1(b)(ii)	two values of L within 1 cm apart AND including the value given in **(b)(i)**	**1**
	(uncertainty = ±) half the range given in **(b)(ii)**	**1**
1(c)(i)	*EITHER* take two or more readings AND average *OR* move moveable contact from beginning to end of zero range AND take the midpoint	**1**
1(c)(ii)	table with heading for L with units AND evidence of repeat readings	**1**
1(c)(iii)	5 or 6 values for L (<u>all</u> increasing)	**1**
	all values of L to 1 mm precision	**1**
1(d)(i)	*axes* half or more of graph paper used in both x and y directions, no awkward scales	**1**
	plotting all points plotted correctly to within ½ a square	**1**
	line of best fit single line of best fit	**1**
1(d)(ii)	points identified correctly AND correct use of change in R ÷ change in L	**1**
1(e)	($T =$) the value of the gradient AND correct unit	**1**
	($U =$) the y-intercept AND correct unit	**1**
1(f)	numerical U in range of 65 to 95	**1**

Question	Answer	Marks
2(a)(i)	silver nitrate AND no precipitate / no reaction	1
	barium nitrate / chloride AND white precipitate	1
	(anion present =) sulfate (no mark)	
2(a)(ii)	red-brown precipitate AND insoluble in excess for sodium hydroxide	1
	red-brown precipitate AND insoluble in excess for ammonia	1
	iron(III) / Fe^{3+}	1
2(b)(i)	4 temperature readings	1
	all recorded to suitable precision of 1 decimal place	1
	2 temperature increases correctly calculated	1
	experiment 2 increase smaller than experiment 1 increase	1
2(b)(ii)	**Z** more dilute / less acidic than **X**	1
2(c)	smaller temperature rise AND greater heat energy lost / poorer insulation	1
2(d)(i)	calculation of molarity from ratio of temperature rises	1
2(d)(ii)	calculation of moles sulfuric acid in 100 cm^3 of **Z**	1
2(d)(iii)	calculation of moles of sulfuric acid which reacted with magnesium	1
2(d)(iv)	mass of magnesium	1