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**COMBINED SCIENCE**

**0653/61**

Paper 6 Alternative to Practical

**October/November 2017**

MARK SCHEME

Maximum Mark: 60

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**Published**

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This document consists of **7** printed pages.

Question	Answer	Marks
1(a)	Syringe / burette ;	1
1(b)	3 and 2 ;	1
1(c)	Axes labelled time <b>and</b> s (on y) concentration <b>and</b> % (on x) ; Suitable linear scale using at least half the grid ; all 4 points plotted correctly $\pm$ half small square ; Best fit line ;	4
1(d)	Decreasing <u>concentration</u> increases <u>time</u> ORA ;	1
1(e)(i)	All temps below 100 ;  At least 3 below 50 must be above 0 ;	2
1(e)(ii)	<b>two</b> from: Volume of milk Same type of milk pH concentration of enzyme volume of enzyme volume of water	1

Question	Answer	Marks
2(a)(i)	$T_1$ 21.5 ; $T_2$ 34.0 ;	2
2(a)(ii)	(+ ) 12.5 ;	1
2(a)(iii)	exothermic ;	1
2(b)(i)	alkaline ;	1
2(b)(ii)	limewater / calcium hydroxide / $\text{Ca}(\text{OH})_2$ ;	1
2(b)(iii)	sodium hydroxide ;	1
2(c)	<b>(H is) calcium (oxide) ;</b>  <b>H + water gives limewater for <math>\text{CO}_2</math> test / calcium oxide reacts exothermically with water / F must be calcium hydroxide / F is limewater ;</b>	2
2(d)	chloride / $\text{Cl}^-$ ;	1

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
3(a)	1.4 ; 0.32 ;	<b>2</b>
3(b)(i)	to prevent wire getting hot / resistance of wire changing / cell running down ;	<b>1</b>
3(b)(ii)	ammeter shows a reading ;	<b>1</b>
3(c)(i)	W / watt(s) ;	<b>1</b>
3(c)(ii)	0.23 <b>and</b> 0.17; 2 decimal places ;	<b>2</b>
3(d)(i)	a straight line with a positive gradient ; through the origin ;	<b>2</b>
3(d)(ii)	(actual values used to show that (for example)), doubling $I$ does not double $P$ ;	<b>1</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
4(a)	Root hair ;	<b>1</b>
4(b)(i)	Quality drawing using at least half the box ; Nucleus correctly labelled ; Cell wall correctly labelled ;	<b>3</b>
4(b)(ii)	$34 \pm 1$ ;	<b>1</b>
4(b)(iii)	Measurement to nearest mm ;	<b>1</b>
4(b)(iv)	Magnification correctly calculated ;	<b>1</b>
4(c)	Starch present ;	<b>1</b>
4(d)	select <u>anther</u> ; use a microscope to observe ;	<b>2</b>

Question	Answer	Marks
5(a)(i)	6.96 ; 6.85 ;	<b>2</b>
5(a)(ii)	0.49 and 0.49 ; + and – ;	<b>2</b>
5(b)	any <b>two</b> from: stays as blue ;  mass changes are the same at the electrodes ;  anode dissolves / copper ions from anode go into solution ;	<b>2</b>
5(c)(i)	(iron and copper) because copper dissolves from the anode / positive / plates on the cathode / negative ;	<b>1</b>
5(c)(ii)	copper sulfate (solution) ;	<b>1</b>
5(c)(iii)	smaller  pink / orange / copper coloured  blue / unchanged ;;  all 3 correct = 2 marks; 1 or 2 correct = 1 mark	<b>2</b>

Question	Answer	Marks
6(a)(i)	correct position marked ;	1
6(a)(ii)	0.87 ;	1
6(a)(iii)	data to 2 sf / <u>large</u> variation in raw data ;	1
6(b)(i)	0.76, 0.98, 1.21 correct answers only ;	1
6(b)(ii)	plots correct to half a small square – at least 4 correct ;  good best fit line judgement ;	2
6(b)(iii)	indication <u>on graph</u> of how data obtained AND at least half of line used ;  correct calculation for triangle method using data from graph ;	2
6(c)(i)	correct answer from candidate's gradient value ;	1
6(c)(ii)	reduces percentage error in the time / reduces the <u>effect</u> of (human) reaction error ;	1