



Cambridge IGCSE™

COMBINED SCIENCE**0653/61**

Paper 6 Alternative to Practical

May/June 2021**MARK SCHEME**Maximum Mark: 40

Published

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This document consists of **8** printed pages.

Question	Answer	Marks
1(a)(i)	4 (%);	1
1(a)(ii)	(A) 234 ; (C) 45 ;	2
1(a)(iii)	the higher the concentration of hydrogen peroxide / H_2O_2 , the shorter the time taken / the faster the potato rises / ORA ;	1
1(a)(iv)	(when using scalpel) cut on solid surface / away from fingers / hold with forceps ;	1
1(a)(v)	<i>any two from</i> , size / volume / surface area / thickness, of potato ; volume / height, of solution in test-tube ; type of potato / same potato ;	2
1(a)(vi)	time too short (to measure) / too fast to measure time ;	1
1(a)(vii)	longer time / slower, because potato slices heavier ; OR shorter time / faster, because potato slices larger surface area / more enzyme / more catalase ;	1
1(b)	starch ; blue / black ;	2
1(c)(i)	heat (the mixture) ;	1
1(c)(ii)	red / orange / yellow / green ;	1

Question	Answer			Marks																		
2(a)	<table><tr><th>solution</th><th>colour with Universal Indicator</th><th>pH of solution</th></tr><tr><td>F</td><td>red</td><td>0 to 3</td></tr><tr><td>G</td><td>green</td><td>7</td></tr><tr><td>H</td><td>blue-green</td><td>8 to 9</td></tr><tr><td>J</td><td>purple</td><td>12 to 14</td></tr><tr><td>K</td><td>red</td><td>0 to 3</td></tr></table> all five values correct (2) two values correct (1)			solution	colour with Universal Indicator	pH of solution	F	red	0 to 3	G	green	7	H	blue-green	8 to 9	J	purple	12 to 14	K	red	0 to 3	2
solution	colour with Universal Indicator	pH of solution																				
F	red	0 to 3																				
G	green	7																				
H	blue-green	8 to 9																				
J	purple	12 to 14																				
K	red	0 to 3																				
2(b)(i)	F and K in either order G H J ;			1																		
2(b)(ii)	both have the same colour (with UI) / both have the same pH / both turn a red colour (with UI);			1																		
2(c)	burning splint / lighted splint ; a (squeaky) pop ;			2																		
2(d)	limewater ;			1																		

Question	Answer	Marks
3	One marking point from each section and any <u>two</u> others (e.g. if one section missed max 6 etc.): 1 apparatus thermometer AND stopwatch / stop-clock ; balance (to measure sodium carbonate) / measuring cylinder / syringe (to measure acid) ; water-bath ; 2 brief description and safety precautions idea of adding sodium carbonate to acid of different temperatures ; repeat experiment at same temperature ; idea of doing at least five different temperatures ; wearing safety goggles to protect eyes because acid is corrosive / wear goggles to avoid powder or acid getting into the eyes ; 3 measurements time (in seconds) (from when powder added) to when fizzing / bubbles, stop / when volume of gas collected stays constant ; measure temperature of acid (before mixing with sodium carbonate) / suggests suitable values for temperature between 0 and 90 °C ; 4 variables constant same volume / amount / cm³, of acid ; same concentration of acid ; same mass of sodium carbonate / amount of sodium carbonate ; 5 processing calculate average times from repeated experiments ; plot graph of reaction time against temperature / look at pattern in reaction time as temperature increases / shorter time means a faster rate OR a ;	7

Question	Answer	Marks
4(a)	60 (mm) ;	1
4(b)	because of the risk of elastic band to eyes ;	1
4(c)	6.5 (N) ;	1
4(d)(i)	suitable linear scale chosen ; points for increasing force plotted correctly ;	2
4(d)(ii)	good best-fit curve judgement for increasing force and curve labelled ;	1
4(d)(iii)	correct value from candidate's graph (mm) ;	1
4(d)(iv)	points for decreasing force plotted correctly on same grid ;	1
4(d)(v)	good best-fit curve judgement for decreasing force and curve labelled ;	1
4(e)(i)	evidence of use of approximating squares or alternative method ; value calculated from candidate's graph, reported to whole squares, in the range 18–28 ;	2
4(e)(ii)	smaller increments of mass added between each measurement ;	1
4(f)	0.15 (J) ;	1