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**COMBINED SCIENCE**

**0653/61**

Paper 6 Alternative to Practical

**May/June 2018**

MARK SCHEME

Maximum Mark: 60

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**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.

Cambridge International will not enter into discussions about these mark schemes.

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**Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

**GENERIC MARKING PRINCIPLE 1:**

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

**GENERIC MARKING PRINCIPLE 2:**

Marks awarded are always **whole marks** (not half marks, or other fractions).

**GENERIC MARKING PRINCIPLE 3:**

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

**GENERIC MARKING PRINCIPLE 4:**

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

**GENERIC MARKING PRINCIPLE 5:**

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

**GENERIC MARKING PRINCIPLE 6:**

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Question	Answer	Marks
1(a)(i)	axes labelled with units ; at least 6 points plotted correctly $\pm$ half small square ;	<b>2</b>
1(a)(ii)	smooth curve ;	<b>1</b>
1(b)(i)	correct reading from graph and shown on graph $\pm$ half small square ;	<b>1</b>
1(b)(ii)	decreases ;	<b>1</b>
1(c)	gloves because enzyme present / goggles to protect eyes from splashes ;	<b>1</b>
1(d)	any <b>four</b> from: same volume / concentration of peroxide / solution ; same volume of bean puree / same batch of puree ; same time / same height ; minimum of 5 different temperatures ; sensible range of temperatures ; graph of volume against time for each temperature / volume in fixed time against temperature ;	<b>4</b>

Question	Answer	Marks
2(a)(i)	<b>H AND</b> white ppt. (with silver nitrate) / <b>H AND</b> (white) ppt dissolves in ammonia ;	<b>1</b>
2(a)(ii)	yes <b>AND</b> different coloured ppts. ;	<b>1</b>
2(a)(iii)	no need to eliminate carbonate / cannot be a carbonate / already know solutions are halides ;	<b>1</b>
2(b)(i)	<b>J and K</b> <b>AND</b> reference to possible bromine colour ;	<b>1</b>
2(b)(ii)	ventilated lab / fume cupboard ;	<b>1</b>
2(b)(iii)	add bromine water ; iodide will go darker / orange ; OR add starch ; blue-black ;	<b>2</b>
2(c)(i)	burette / (graduated) pipette ;	<b>1</b>
2(c)(ii)	indicator would be an impurity ;	<b>1</b>
2(c)(iii)	repeat (with indicator and take average volume) ;	<b>1</b>

Question	Answer	Marks
3(a)(i)	$l_0 = 28 \pm 1$ ;	<b>1</b>
3(a)(ii)	view perpendicular to scale / ruler close to spring / use of fiducial aid ;	<b>1</b>
3(b)	subtraction of two lengths ; 39 (mm) ;	<b>2</b>
3(c)(i)	suitable choice of scales and linear ( $\geq$ half the grid used) ; 4 plots correct to half a small square ;	<b>2</b>
3(c)(ii)	good best fit line judgement ;	<b>1</b>
3(c)(iii)	correct intercept read from / axis $\pm 1$ mm and evidence from graph ;	<b>1</b>
3(d)	expect Yes – answers the same / close enough / within 10% / 15% / within experimental error ;	<b>1</b>
3(e)	steeper gradient graph ;	<b>1</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
4(a)(i)	clear outline of cell (not feathery) ; approximately the correct shape and nucleus ; larger than original <b>AND</b> one cell ;	<b>3</b>
4(a)(ii)	nucleus correctly labelled ;	<b>1</b>
4(b)(i)	$51 \pm 2$ ;	<b>1</b>
4(b)(ii)	Drawn line and measure length ;	<b>1</b>
4(b)(iii)	correct calculation of magnification ;	<b>1</b>
4(c)	add alcohol ; pour into water ; white emulsion ;	<b>3</b>

Question	Answer	Marks
5(a)	A D B E ;;; <b>OR</b> A above D ; D above B ; B above E ;	<b>3</b>
5(b)	Green powder in beaker / powder seen / solid in beaker / no more bubbles / gas ;	<b>1</b>
5(c)	filter funnel and filter paper and v shown in filter paper ; filter paper or funnel labelled AND copper carbonate / residue labelled AND copper sulfate / filtrate labelled ;	<b>2</b>
5(d)(i)	to react all of the acid / make sure crystals are pure ;	<b>1</b>
5(d)(ii)	to obtain (large) crystals ;	<b>1</b>
5(e)	(pale) blue ppt ; deep blue solution ;	<b>2</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
6(a)	correct symbol for ammeter and voltmeter ; ammeter in series and voltmeter in parallel correctly ;	<b>2</b>
6(b)(i)	0.12 (A) ; 2.8 (V) ; 12 ONLY(s) ;	<b>3</b>
6(b)(ii)	4.0 ;	<b>1</b>
6(b)(iii)	0.56 ;	<b>1</b>
6(b)(iv)	14 % iii   ii ;	<b>1</b>
6(c)	Energy loss due to resistance (this is the largest) / heat / sound ;	<b>1</b>
6(d)	do more circuits and average / repeat and average ;	<b>1</b>