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**COMBINED SCIENCE**

**0653/52**

Paper 5 Practical Test

**May/June 2019**

MARK SCHEME

Maximum Mark: 40

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

**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)	all heights recorded ; heights clearly in mm ;	<b>2</b>
1(b)(i)	as volume increases height of ppt increases ;	<b>1</b>
1(b)(ii)	increases <b>and</b> then stays the same ; reagent(s) all used up / barium nitrate all used up / more sodium sulfate than barium nitrate idea / reaction finished ;	<b>2</b>
1(b)(iii)	<i>any 2 from:</i> volumes with syringe / burette <b>and</b> more precise than measuring cylinder ; do experiment in a measuring cylinder to measure volume of precipitate ; ruler without dead space <b>and</b> difficult to get actual length due to the dead space so had to pick up tube and not level etc. ; measure at eye level to avoid parallax error ; leave to settle longer to make sure all ppt had settled ; repeat and reduces errors / spots anomalies ;	<b>2</b>
1(c)(i)	axes labelled with units with height on vertical axis and volume of ammonia on horizontal ; reasonable linear scale more than half grid ; at least 5 points plotted correctly to within half a small square ;	<b>3</b>
1(c)(ii)	2 best-fit straight lines ;	<b>1</b>
1(c)(iii)	value from graph $\pm \frac{1}{2}$ small square ;	<b>1</b>
1(c)(iv)	ppt dissolves ;	<b>1</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(a)(i)	as a control / to compare with enzyme ;	<b>1</b>
2(a)(ii)	<i>any 2 from:</i> temperature ; mass / amount of apple ; pH ; volume added ; type of apple ;	<b>2</b>
2(b)(i)	funnel <b>and</b> filter paper, shown with 'V' at bottom ;  use of measuring cylinder ;  at least two labels (funnel, filter paper, measuring cylinder) ;	<b>3</b>
2(b)(ii)	volume of <b>A</b> greater than <b>B</b> ;	<b>1</b>

Question	Answer	Marks
3	<p><b>1 apparatus</b> potometer / balance / shoot in water ; stop-clock ; suitable container / bell jar / bag / box (to contain moist air) ;</p> <p><b>2 method</b> plant in different levels of moisture ; same amount of time ; repeat experiment at each level of moisture ; safety linked to apparatus / hygiene / procedure ;</p> <p><b>3 control of variables</b> control size / type of plant / number / surface area / size of leaves ; control wind / temperature / (sun)light ; control amount of water given to plant ;</p> <p><b>4 measurements, processing and use of results</b> (dependent variable is) movement of water/bubble/meniscus in potometer / weight loss of leaves / weigh plant or leaves before and after ; measure humidity ; calculate rate of water loss / transpiration / mass lost per unit time ; graph of mass lost against humidity ; compare e.g. mass / water lost in dry and humid / compare mass at different humidities ;</p>	7

Question	Answer	Marks
4(a)(i)	$m_a$ and $m_b$ recorded to 0.01 g <b>and</b> $m_b$ roughly 100 g more than $m_a$ ;	<b>1</b>
4(a)(ii)	correct calculation of $m_w$ ;	<b>1</b>
4(a)(iii)	suitable value recorded to nearest 0.5 °C ;	<b>1</b>
4(b)(i)	mass recorded to 0.01 g ;	<b>1</b>
4(b)(ii)	$T_f < T_i$ ;	<b>1</b>
4(b)(iii)	$m_f < m_i$ ;	<b>1</b>
4(b)(iv)	ensures all water at same temperature OWTTE ;	<b>1</b>
4(c)(i)	correct calculation of $T_d$ ;	<b>1</b>
4(c)(ii)	correct calculation of $E_l$ ; <u>correctly rounded</u> to 2 or 3 sig figs ;	<b>2</b>
4(d)(i)	correct calculation of $m_m$ ;	<b>1</b>
4(d)(ii)	correct calculation of $E_m$ ;	<b>1</b>
4(e)	energy has come from the glass / surroundings ;	<b>1</b>