Cambridge Assessment International Education

Cambridge IGCSE™

CO-ORDINATED SCIENCES **0654/52**

Paper 5 Practical Test **May/June 2020**

MARK SCHEME

Maximum Mark: 60

Published

Students did not sit exam papers in the June 2020 series due to the Covid-19 global pandemic.

This mark scheme is published to support teachers and students and should be read together with the question paper. It shows the requirements of the exam. The answer column of the mark scheme shows the proposed basis on which Examiners would award marks for this exam. Where appropriate, this column also provides the most likely acceptable alternative responses expected from students. Examiners usually review the mark scheme after they have seen student responses and update the mark scheme if appropriate. In the June series, Examiners were unable to consider the acceptability of alternative responses, as there were no student responses to consider.

Mark schemes should usually be read together with the Principal Examiner Report for Teachers. However, because students did not sit exam papers, there is no Principal Examiner Report for Teachers for the June 2020 series.

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

Cambridge International is publishing the mark schemes for the June 2020 series for most Cambridge IGCSE™ and Cambridge International A & AS Level components, and some Cambridge O Level components.

[Turn over

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.

Science-Specific Marking Principles

1	Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.
2	The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.
3	Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).
4	The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.

5 'List rule' guidance (see examples below)

For questions that require ***n*** responses (e.g. State **two** reasons …):

- The response should be read as continuous prose, even when numbered answer spaces are provided
- Any response marked *ignore* in the mark scheme should not count towards ***n***
- Incorrect responses should not be awarded credit but will still count towards ***n***
- Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response
- Non-contradictory responses after the first ***n*** responses may be ignored even if they include incorrect science.

6 Calculation specific guidance

Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.

For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.

For answers given in standard form, (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.

Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.

7 Guidance for chemical equations

Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.

State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

Question	Answer	Marks
1(a)(i)	value recorded at two minutes; full set of results; shows evidence of slowing down at 10 minutes;	**3**
1(a)(ii)	mins **and** cm^3 ;	**1**
1(b)(i)	axes correct way round and labelled with quantity and unit; appropriate linear scales where the plotted points use at least half of the grid ; all points plotted correctly ± half small square;	**3**
1(b)(ii)	**curve** of best fit ;	**1**
1(c)	correct reading from graph; graph marked, preferably with horizontal and vertical lines from 3 mins to the line and other axis ;	**2**
1(d)	at least three values; values quoted **and** includes values above and below 35;	**2**

Question	Answer	Marks
2(a)	food sample: final colour observed with Benedict's solution: yellow / green / orange / red; final colour observed with biuret solution: blue; final colour observed with Iodine solution: [blank] bread: [blank] final colour observed with biuret solution: lilac / purple; final colour observed with Iodine solution: blue-black;	**4**
2(b)	reducing sugar; protein and starch;	**2**
2(c)(i)	ethanol **and** water ;	**1**
2(c)(ii)	white emulsion ;	**1**

Question	Answer	Marks
3(a)	white precipitate (in a blue solution) ;	**1**
3(b)	light-blue precipitate that will not dissolve in excess ;	**1**
3(c)	light-blue precipitate that is soluble in excess to give a dark blue solution ;	**1**
3(d)(i)	**J** is (aqueous) copper sulfate ;	**1**
3(d)(ii)	**K** is (aqueous) barium nitrate ;	**1**
3(d)(iii)	**L** is (aqueous) sodium hydroxide and **M** is (aqueous) ammonia ; any one from: copper ions react with sodium hydroxide to give a blue precipitate (so **L** is sodium hydroxide) ; copper ions react with aqueous ammonia to give a blue precipitate that redissolves to give a blue solution (so **M** is ammonia) ;	**2**

Question	Answer	Marks
4(a)(i)	any temperature reading recorded to the nearest 0.5°C ;	**1**
4(a)(ii)	lowest temperature recorded to the nearest 0.5°C (lower than 4ai) ;	**1**
4(a)(iii)	ΔT to within $\pm$2°C of the supervisor's result ;	**1**
4(b)	correct calculation of $E = 105 \times \Delta T$;	**1**
4(c)	any two from: use a lid ; use a plastic beaker / polystyrene cup ; insulate beaker with foam or material;	**2**
4(d)	makes the results more reliable / can check to see if result was anomalous;	**1**

Question	Answer	Marks
5	one mark from each section and any 1 other (if one section is missed max 5 etc.) **apparatus** suitable container, e.g. test-tube or crucible **and** suitable way of heating with a Bunsen flame, e.g. in a test-tube or on a tripod ; mass balance ; **method and safety precaution** heat copper carbonate until the reaction is complete ; use of goggles / test-tube holders / tongs / do not point test-tube at anyone with reason (e.g. goggles to protect the eyes from hot solid shooting out of tube/test-tube holders to prevent burning the skin from the hot apparatus) ; **masses used** repeat with at least 3 masses / 5 masses if graph drawn ; masses chosen will fit into container heated ; **measurements** mass of copper carbonate before and mass of copper oxide after heating ; **processing and conclusion** idea of calculating the mass of either copper carbonate or copper oxide by taking away the mass of the container if used ; plot graph of mass of copper carbonate against mass of copper oxide ; if a straight line through origin then it is directly proportional / upwards sloping line means more mass of copper oxide formed as mass of copper carbonate increases / downwards sloping line means less mass of copper oxide formed as mass of copper carbonate increases ; idea of comparing the results and looking for a trend i.e. as the mass of copper carbonate increases look to see if the mass of copper oxide formed increases or decreases ;	**6**

Question	Answer	Marks
6(a)	*h* recorded and is within 0.1 cm of the supervisors result ;	**1**
6(b)(i)	*v* recorded to nearest 0.1 cm;	**1**
6(b)(ii)	*H* recorded to nearest 0.1 cm;	**1**
6(b)(iii)	$v = 24.0 \pm 0.5$ cm; $H = 0.6 \pm 0.1$ cm;	**2**
6(c)	*m* calculated correctly from candidate's values;	**1**
6(d)	*f* values correct; both values to 3 significant figures;	**2**
6(e)	(expect YES) values are (very) close / not (very)far apart / within 10% of each other / the same; (If values for f are incorrect and not close allow the reverse argument)	**1**
6(f)	any one from: use of darkened room / use a brighter lamp; mark position of centre of lens in holder; place metre rule on bench / clamp in position; ensure the centre of lens and the object are the same height above bench / object and screen vertical repeat and average;	**1**

Question	Answer	Marks
7(a)(i)	θ_C recorded to the nearest 0.5°C;	**1**
7(a)(ii)	θ_H recorded to the nearest 0.5°C;	**1**
7(b)	θ_M recorded ; and between θ_C and θ_H ;	**2**
7(c)	to ensure that all the water is at the same temperature;	**1**

Question	Answer	Marks
7(d)	**both** subtractions for $\Delta\theta$ correct;	**1**
7(e)	**both** calculations correct;	**1**
7(f)	E_L calculation correct;	**1**
7(g)(i)	used to heat the glass beaker / lost by evaporation or conduction (through glass) or convection into the air / lost during transfer;	**1**
7(g)(ii)	use a lid / insulate (lag) the beaker / transfer the cold water as quickly as possible;	**1**