Cambridge Assessment International Education

Cambridge IGCSE™ (9–1)

CO-ORDINATED SCIENCES (9–1) **0973/61**

Paper 6 Alternative to Practical **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.

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 <u>‘List rule’ guidance</u> (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 <u>Calculation specific guidance</u>

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 <u>Guidance for chemical equations</u>

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)	clear and continuous outline; uses at least half of the box; detail including petals, filament and style;	**3**
1(a)(ii)	anther correctly labelled; petal correctly labelled; stigma correctly labelled;	**3**
1(b)(i)	correct measurement in mm;	**1**
1(b)(ii)	line drawn and correct measurement;	**1**
1(b)(iii)	correct calculation with correct rounding; to 2 sf ;	**2**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)</td><td><table><tr><td>nectar</td><td>yellow / green / orange / red;</td><td>blue and …..</td><td>…..orange / brown;</td></tr><tr><td>pollen</td><td>blue and …….</td><td>purple;</td><td>…...orange / brown;</td></tr></table></td><td>4</td></tr>
<tr><td>2(b)</td><td>nectar contains reducing sugar;
pollen contains protein;</td><td>2</td></tr>
<tr><td>2(c)</td><td>add ethanol (shake and pour solution into) water;
white emulsion;</td><td>2</td></tr>
<tr><td>2(d)</td><td>any two from:
volume of Benedict’s solution;
mass / volume / concentration of food;
time in water bath / left in water bath for same time;
temperature of water bath;</td><td>2</td></tr>
</table>

Question	Answer	Marks
3(a)	**K** is (aqueous) copper(II) chloride ;	**1**
3(b)(i)	**M** is (aqueous) ammonia ;	**1**
3(b)(ii)	**L** is (aqueous) sodium hydroxide ;	**1**
3(b)(iii)	**J** is (aqueous) zinc sulfate and **N** is (aqueous) barium nitrate ; any one from: zinc ions react with aqueous sodium hydroxide to give a white ppt. that redissolves to give a colourless solution (so **J** is zinc sulfate) ; (zinc) sulfates react with barium nitrate to give a white precipitate (so **N** is barium nitrate) ;	**2**
3(c)(i)	method of collection – gas syringe / displacement of water ; the diagram will work, i.e. gas tight and labelled;	**2**
3(c)(ii)	(dissolve in water and add) sodium hydroxide gas made turns (moist) red litmus (paper) blue ;	**1**

Question	Answer	Marks
4(a)	temperature of sodium hydroxide = 21.0 ; highest temperature = 25.5 ;	**2**
4(b)	5(.0) **and** ; 4.5 ;	**1**
4(c)	highest temperature (of mixture in beaker) ;	**1**
4(d)(i)	y-axis labelled temperature change / °C **and** x-axis labelled volume of hydrochloric acid / cm^3 ; appropriate linear scales where the plotted points use at least half of the grid ; all points plotted correctly ± half a small square ;	**3**

Question	Answer	Marks
4(d)(ii)	**curve** of best fit ;	**1**
4(e)	use candidates graph to determine volume to within $\pm 0.5\,cm^3$;	**1**
4(f)(i)	**highest** temperature will be lower / temperature **rise** will be lower;	**1**
4(f)(ii)	insulate the beaker / use a plastic beaker / use a lid;	**1**
4(g)	smaller percentage uncertainty / smaller error;	**1**

Question	Answer	Marks
5(a)(i)	2.4 cm;	**1**
5(a)(ii)	0.4 cm;	**1**
5(a)(iii)	*w* **and** larger than *t* / *t* very small / rule measures to 1 mm so greater effect of error on smaller distance;	**1**
5(b)	96 (cm^3) correctly rounded;	**1**
5(c)(i)	$x_1 = 9.2$ (cm);	**1**
5(c)(ii)	note reading on either side of mass and find the mean value / AW;	**1**
5(c)(iii)	$x_2 = 12.3$ (cm);	**1**
5(c)(iv)	$M = 122.55$ (g);	**1**
5(d)(i)	difficulty in obtaining an exact balance; difficulty in placing the centre of the mass over the correct mark on the rule;	**2**
5(d)(ii)	use a balance;	**1**
5(e)	density correct from candidate's values and rounded correctly; g/cm^3;	**2**

Question	Answer	Marks
6	one mark from each section and any two others (if one section is omitted then max 6 etc.) **method** time hot water (in beaker) cooling; repeat for different volume(s)of water; **number and range of volumes** at least 5 volumes ; at least 100 cm^3 difference between the largest and smallest volume ; **key variables** initial temperature of the hot water; temperature of the surroundings / room temperature; size / shape of beaker; time of cooling / same temperature drop; **table** headings: volume, temperature / time; and all correct units present; **conclusion** compare temperature drops in equal times–largest drop gives greatest rate; compare times for the same temperature drops–least time gives greatest rate; calculate the rate of temperature fall each time and compare; plot graphs of temperature against time and compare gradients/steeper gradient cools faster ;	**7**