Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/32**

Paper 3 Theory (Core) **May/June 2021**

MARK SCHEME

Maximum Mark: 80

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.

Cambridge International is publishing the mark schemes for the May/June 2021 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

© UCLES 2021

[Turn over

PUBLISHED

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.

© UCLES 2021

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 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.

© UCLES 2021

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.

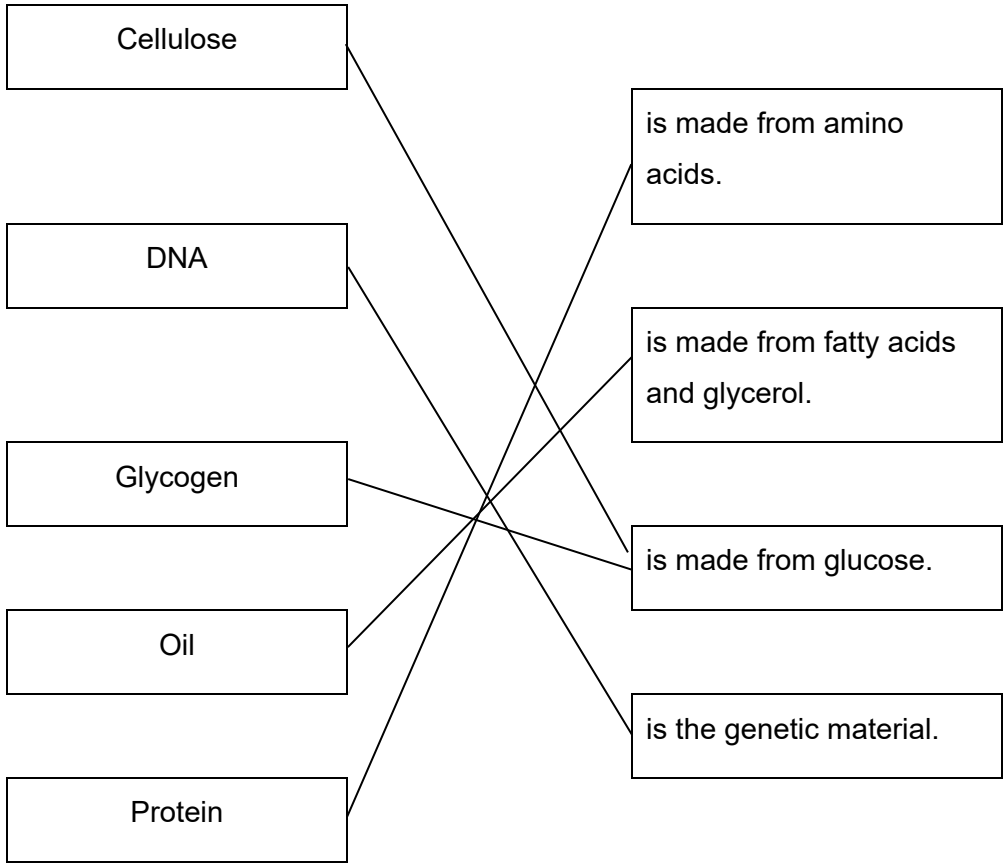
© UCLES 2021

Question	Answer	Marks	Guidance
1(a)(i)	lung correctly identified with a label and a label line ; diaphragm correctly identified with a label and a label line ;	**2**	
1(a)(ii)	trachea ;	**1**	
1(a)(iii)	*any three from* : mouth / nose ; larynx ; bronchus / bronchi ; bronchioles ; alveoli ; capillary wall / AW ; plasma ;	**3**	
1(a)(iv)	diffusion ;	**1**	
1(b)(i)	pulmonary artery ;	**1**	
1(b)(ii)	*any two from* : large surface area ; thin / one cell thick / AW ; good blood supply / many capillaries ; short diffusion, distance / pathway ;	**2**	
1(c)	lower carbon dioxide concentration / less water vapour ;	**1**	

© UCLES 2021

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>2(a)(i)</td><td>carbon, hydrogen, oxygen ;</td><td>1</td><td></td></tr>
<tr><td>2(a)(ii)</td><td>nitrogen ;</td><td>1</td><td></td></tr>
<tr><td>2(b)(i)</td><td>carbon dioxide + water ; ⟶ glucose + oxygen ;</td><td>2</td><td></td></tr>
<tr><td>2(b)(ii)</td><td>any two from:
no photosynthesis in the dark / light required, for photosynthesis / to make glucose / AW ;
starch converted to glucose / AW ;
(starch / glucose,) used, for respiration OR as a source of energy / AW ;</td><td>2</td><td></td></tr>
<tr><td>2(b)(iii)</td><td><table><tr><th>part of leaf</th><th>starch present</th><th>starch absent</th></tr><tr><td>green</td><td>✓</td><td></td></tr><tr><td>white</td><td></td><td>✓</td></tr></table>;</td><td>1</td><td></td></tr>
<tr><td>2(b)(iv)</td><td>magnesium ;</td><td>1</td><td></td></tr>
</table>

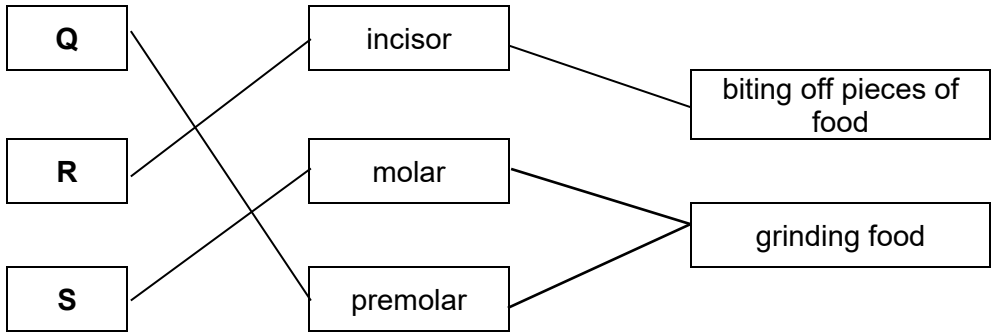
© UCLES 2021

Question	Answer	Marks	Guidance
2(c)	**large molecule** / **sentence endings**  ;;;;;	**5**	one mark for each correct line **R** each additional line

Question	Answer	Marks	Guidance
3(a)(i)	tick in the box next to 'a ball of cells' **;**	**1**	**R** additional ticks
3(a)(ii)	 **;;;**	**3**	one mark for **F** at the start and **D** at the end one mark for **G** before **E** one mark for **E** before **H**
3(b)	uterus wall **;** cervix **;** amniotic sac **;** vagina / cervix **;** umbilical cord **;** afterbirth **;**	**6**	

Question	Answer	Marks	Guidance
4(a)(i)	changing the genetic material of an organism **;** by, removing / changing / inserting, (individual) genes **;**	**2**	
4(a)(ii)	*any one from:* (insertion of human genes) into bacteria, to produce human insulin **;** (insertion of genes into crop) plants, to confer resistance to herbicides **;** (insertion of genes into crop) plants, to confer resistance to insect pests **;** (insertion of genes into crop) plants, to provide additional vitamins **;** AVP **;** e.g. named examples	**1**	**AW** throughout
4(b)(i)	*parental genotypes:* **AA and Aa ;** *gametes:* **A A** (×) **A a ;** *offspring genotypes:* **AA**, **AA**, **Aa**, **Aa ;** *offspring phenotypes:* all normal wings **;** *probability:* zero **;**	**5**	ecf for each subsequent row

Question	Answer	Marks	Guidance
4(b)(ii)	**AA ;**	**1**	**A** homozygous dominant
4(b)(iii)	*Drosophila* **;**	**1**	

Question	Answer	Marks	Guidance
5(a)(i)	cement correctly identified with a label and a label line **;** gum correctly identified with a label and a label line **;** nerves correctly identified with a label and a label line **;**	**3**	
5(a)(ii)	piercing / tearing / gripping, (food) **;**	**1**	
5(b)	**letter from Fig 5.2** **name** **function**  **;;;;;**	**5**	mark by column first column: 3 correct names = 2 marks 1 or 2 correct names = 1 mark last column: 3 correct functions = 3 marks 2 correct functions = 2 marks 1 correct function = 1 mark **R** each additional line
5(c)	mechanical **;**	**1**	**A** physical

Question	Answer	Marks	Guidance
5(d)(i)	*any four from:* (coating of) bacteria and food / plaque, on teeth ; bacteria respire (the sugars in food) **;** (bacteria) produce acid **;** (acid) dissolves, enamel / **A** / dentine / **B** **;** *idea of* nerves / pulp cavity / **C**, exposed / reached / AW **;**	**4**	
5(d)(ii)	*any one from:* regular brushing (of teeth) / described **;** ref. to less sugar in diet / AW **;** regular use of toothpaste **;** AVP **;**	**1**	

Question	Answer	Marks	Guidance
6(a)(i)	1 pulse rates for both students increase, during exercise / at 10–15 minutes / for 5 minutes **;** 2 pulse rate for both students plateau, during exercise / at 15–25 minutes / for 10 minutes / until 25 minutes **;** 3 pulse rate for both students decreases, after exercise / at 25–40 minutes / for 15 minutes / until 40 minutes **;** 4 both students, took the same amount of time to recover from exercise / get back to the same pulse rate as before exercise / AW **;** **5** pulse rate for student **B** increases more than student **A** / AW **;** 6 comparative data quote / manipulation, with units **;**	**4**	
6(a)(ii)	94(%) **;;;**	**3**	MP1 correct readings from graph of 64 and 124 MP2 correct calculation, i.e. 93.75(%) ecf wrong graph readings. MP3 correct rounding to whole number ecf MP2

Question	Answer	Marks	Guidance
6(a)(iii)	*any two from:* ECG **;** listening to the closing of the valves **;** AVP **;**	**2**	
6(b)	(second sentence) 'increase' circled and then 'decrease' circled **;** (third sentence) 'decrease' circled and then 'increase' circled **;**	**2**	

Question	Answer	Marks	Guidance
7(a)	pathogen **;** host **;**	**2**	
7(b)(i)	AIDS **;**	**1**	
7(b)(ii)	283 402 (people infected) **;**	**1**	
7(b)(iii)	bacteria **;**	**1**	
7(c)(i)	<table><tr><th>direct contact</th><th>indirect contact</th></tr><tr><td>blood</td><td>air animal contaminated surfaces food</td></tr></table> **;;**	**2**	5 correct = 2 marks 4 or 3 correct = 1 mark 2 or 1 correct = 0 marks

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>7(c)(ii)</td><td>
<table>
<tr><th>example of defence mechanism</th><th>cells</th><th>chemical</th><th>mechanical</th></tr>
<tr><td>antibody production</td><td>✓</td><td></td><td></td></tr>
<tr><td>hairs in the nose</td><td></td><td></td><td>✓</td></tr>
<tr><td>mucus</td><td></td><td>✓</td><td></td></tr>
<tr><td>phagocytosis</td><td>✓</td><td></td><td></td></tr>
<tr><td>skin</td><td></td><td></td><td>✓</td></tr>
<tr><td>stomach acid</td><td></td><td>✓</td><td></td></tr>
</table>
;;;</td><td>3</td><td>one mark for each correct column</td></tr>
</table>