CAMBRIDGE
OCR

Sample Assessment Material

A Level Biology A

H420/01 Biological processes

MARK SCHEME

MAXIMUM MARK 100

Duration: 2 hours 15 minutes

Version – 3.0

Last updated: February 2026

This document consists of 19 pages

MARKING INSTRUCTIONS

Preparation For Marking

1. RM Assessor

- Access and complete the on-screen marking training packages: OCR Examiner Training (RMA3).
- Read the mark scheme and question paper for this component or unit.
- The mark scheme and question paper are available in RM Assessor or on your Component Page if you use the Training Platform for standardisation.
- Log in to RM Assessor and mark the **required number** of practice scripts and the **required number** of standardisation scripts.

Marking

2. General Guidance

- Mark strictly to the mark scheme.
- Marks awarded must relate directly to the marking criteria.
- If you are in any doubt about applying the mark scheme, consult your Team Leader by phone, email or via the RM Assessor messaging system.
- It is **essential** that you meet the RM Assessor 50% and 100% batch deadlines. For traditional marking this will be 40% and 100%. If you experience problems, contact your Team Leader without delay.
- Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there, then add the annotation '**SEEN**' to confirm that the work has been seen and mark any responses using the annotations.
- The RM Assessor comments box is used by your Team Leader to explain the marking of the practice responses. Use these comments when checking your practice responses. Do not use the comments box for any other reason.
- Before the end of the marking period send a brief report on the performance of candidates to your Team Leader via email. The report should contain notes on strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

3. No Response and Crossed-out Answers

Using the No Response (NR) option. Only mark as NR if:

- the answer space is blank
- there is only a comment not related to the question (e.g., 'can't do', 'don't know')
- there is only a mark (e.g., a dash, a question mark) which is not an attempt at the question.

Note: Enter 0 marks for an attempt that earns no credit (including copying out the question). Do **not** use NR.

Crossed-out answers

If a candidate has crossed out an answer and written a clear alternative, do **not** mark the crossed-out answer.

If a candidate has crossed out an answer and **not** written a clear alternative, mark the crossed-out answer if it is readable.

4. Responses with more answers than needed

- **Multiple-choice question answers**

When a multiple-choice question has only **one** correct answer and a candidate has written two or more answers (even if one of these answers is correct), do **not** award a mark.

When a multiple-choice question asks candidates to select **more than** one option the marking guidance from your Principal Examiner will ensure consistency of approach.

- **Contradictory answers in points-based questions**

Do **not** award any marks, even if one of the answers is correct.

- **Rubric error answers – optional questions**

Where candidates have a choice of question/s and they provide more answers than required, all responses are marked and entered into RM Assessor. The highest mark allowable within the rubric will automatically be selected.

- **Questions that ask for a set number (including 1) of short answers or points**
  Mark only the **first set number** of answers/points. (e.g. **two** reasons for something)

  First mark the answers/points against printed numbers on the answer lines. Mark the first answer/point against each printed number. **Second**, if candidates have not followed the printed numbers, mark the answers/points from left to right on each line. **Third,** mark line by line until the set number of answers/points have been marked. Do **not** mark any remaining answers/points.

  Examiners should use their own judgement to decide if a 'second answer' on the same line is adding more detail to the first answer, or if it is a completely separate answer.

- **Short Answer Questions (requiring a more developed response, worth two or more marks)**

  If the candidates are required to provide a description of, for example, three items and four items are provided, mark line by line until the set number of descriptions have been marked (it is unlikely a candidate will provide more than one response on each line in this scenario).

- **Longer Answer Questions (requiring a developed response)**

  If a candidate has written two or more answers to a question that only requires one (developed) answer, only mark the first answer (which has not been crossed out).

5. Questions using levels of response (LOR):

Read through the whole answer from start to finish, using the Level descriptors to help you decide whether it is a strong or weak answer. The indicative scientific content in the Guidance column indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance. Using a 'best-fit' approach based on the skills and science content evidenced within the answer, first decide which set of level descriptors, Level 1, Level 2 or Level 3, best describes the overall quality of the answer.

Once the level is located, award the higher or lower mark:

The higher mark should be awarded where the level descriptor has been evidenced and all aspects of the communication statement (in italics) have been met.

The lower mark should be awarded where the level descriptor has been evidenced but aspects of the communication statement (in italics) are missing.

In summary:

The skills and science content determines the level.

The communication statement determines the mark within a level.

Level of response questions on this paper are **17(c)(iii)** and **19(b)(ii)**.

6. Annotations available in RM Assessor

Annotation	Meaning
	Correct response
	Incorrect response
	Omission mark
	Benefit of doubt given
	Contradiction
	Rounding error
	Error in number of significant figures
	Error carried forward
	Level 1
	Level 2
	Level 3
	Benefit of doubt not given
	Noted but no credit given
	Ignore
	Blank page

7. Abbreviations, annotations and conventions used in the mark scheme (including subject-specific conventions).

Abbreviation / Annotation	Meaning
/	alternative and acceptable answers for the same marking point
✓	Separates marking points
DO NOT ALLOW	Answers which are not worthy of credit
IGNORE	Statements which are irrelevant
ALLOW	Answers that can be accepted
( )	Words which are not essential to gain credit
__	Underlined words must be present in answer to score a mark
ECF	Error carried forward
AW	Alternative wording
ORA	Or reverse argument

8. Subject-specific Marking Instructions

Introduction

Your first task is to familiarise yourself with:

- the specification, especially the assessment objectives
- the question paper and any inserts or resource booklets
- the mark scheme, including annotation requirements
- the administrative procedures related to the marking process.

The administrative procedures are set out in the OCR booklet **Instructions for Examiners**.

If you are examining for the first time, please read **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

All relevant training materials are accessed from the Training Platform.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

Section A

Question	Answer	Marks	Guidance
1	D	1	
2	D	1	
3	A	1	
4	A	1	
5	C	1	
6	D	1	
7	B	1	
8	B	1	
9	B	1	
10	B	1	
11	C	1	
12	C	1	
13	A	1	
14	C	1	
15	C	1	
	Total	15	

Question			Answer	Marks	Guidance
16	(a)	(i)	**FIRST CHECK ANSWER ON ANSWER LINE** **If answer =** 58 (%) **award 4 marks** *normal rate* (60 * 1) /0.7 78.9 bpm ✓ *rate for tachycardia* (60 * 1) /0.5 125 bpm ✓ *percentage increase* 58 (%) ✓✓	**4**	**ALLOW** 1.3 bps **ALLOW** 2.1 bps **ALLOW 2 marks** for percentage increase correctly calculated using candidate's figures for rates and answer given to nearest whole number. **ALLOW 1 mark** for correct working [(120 – 78.9) ÷ 78.9 × 100 or correct use of candidate's figures for rates] **or** a correctly calculated but unrounded answer **DO NOT ALLOW** answers that divide by the rate for tachycardia as a percentage **increase** is asked for
		(ii)	lower (Q)R(S) peak ✓ P and T equal in height ✓ width of T wave greater ✓	**max 2**	
	(b)		no distinct**,** P curve / atrial depolarisation ✓ irregular / weak**,** atrial contraction ✓ insufficient blood forced into ventricles ✓ although ventricles contract there is less blood forced from the heart ✓	**max 3**	
			Total	**9**	

Question			Answer	Marks	Guidance
17	(a)		**U** hepatic vein ✓ **V** hepatic artery ✓ **W** hepatic portal vein ✓	3	
	(b)	(i)	mitochondrion ✓	1	**ALLOW** mitochondria.
		(ii)	*either* facilitated diffusion ✓ conversion of ornithine into citrulline creates concentration gradients **or** (molecules are not lipid soluble so) require protein channels to cross membrane ✓ ***or*** active transport ✓ ornithine and citrulline need to be moved into and out of **D** more quickly than would be met by diffusion ✓	2	
		(iii)	deamination / removal of NH_2 group from amino acid ✓	1	
		(iv)	Carbon dioxide / CO_2 ✓	1	
	(c)	(i)	pH temperature substrate/hydrogen peroxide concentration ✓	1	**Two answers required for 1 mark** **DO NOT ALLOW** an answer that includes mass of liver/enzyme concentration
		(ii)	*pH* take pH reading/ensure hydrogen peroxide is same pH for all enzymes concentrations tested ✓	max 1	**ALLOW** use of buffer solutions

Question			Answer	Marks	Guidance
			temperature use liver tissue and hydrogen peroxide at room temperature/same temperature for all enzyme concentrations tested ✓ *substrate concentration* use same concentration and volume of hydrogen peroxide for all enzyme concentrations tested ✓		
		(iii) *	**Level 3 (5–6 marks)** Explanation includes coherent interpretation of the evidence, clearly linking all ideas to explain why and how activity is regulated. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Level 2 (3–4 marks)** Explanation includes clear use of some evidence to support conclusion but ideas may not be clearly linked for both how and why. *There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.* **Level 1 (1–2 marks)** A simple explanation about how or why based on a limited interpretation of the evidence.	**6**	**Indicative scientific content:** *Why* • large quantities of hydrogen peroxide and high turnover number of catalase would mean vigorous reaction and lots of oxygen produced very quickly. *How* • isolation of catalase in peroxisomes • released in small quantities • cells can limit expression of catalase • this effectively limits enzyme concentration and therefore reduces reaction rate • cells have no control over temperature or substrate concentration so enzyme concentration is the only method of control.

Question			Answer	Marks	Guidance
			There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant. **0 marks** No response or no response worthy of credit		
			Total	**16**	

Question			Answer	Marks	Guidance
18	**(a)**	**(i)**	increased photosynthetic activity during daylight ✓ as light intensity increases there is increased activity of the light dependent reaction ✓	**2**	No marks available for describing the shape of the curve
		(ii)	daytime temperatures generally higher than night time ✓ rate of respiration increases with increased temperature as its enzymes are temperature-dependent ✓	**2**	No marks available for describing the shape of the curve
		(iii)	compensation point(s) / carbohydrate produced by photosynthesis equal to carbohydrate used in respiration ✓	**1**	
	(b)	**(i)**	*for all crops* initial increase in assimilation with increasing temperature ✓ at higher temperatures the assimilation decreases ✓	**2**	**DO NOT ALLOW** accounts that describe the curve for each crop individually

Question			Answer	Marks	Guidance
		(ii)	**FIRST CHECK ANSWER ON ANSWER LINES** **If answer =** C3 34.5 and C4 73.5 **award 2 marks** *C3:* (27+42)/2 34.5 ✓ *C4:* (87+60)/2 73.5 ✓	**2**	 **ALLOW** 35 if used (27+43)/2 **ALLOW** 73 if used (86+60)/2
		(iii)	C3 plants assimilate less carbon dioxide than C4 plants ✓ **ora**	**1**	**ALLOW** a conclusion cannot be drawn because there is not enough data on each type of plant
		(iv)	*Sugar cane* - C4 crop 2 ✓ *Barley* - C3 crop 1 ✓	**2**	
	(c)	(i)	deactivation of RuBisCO will reduce**,** carbon dioxide fixation / light independent reaction ✓ the light dependent reaction will reduce when the supply of NADP is reduced ✓ reduction in stomatal aperture will reduce carbon dioxide available for fixation ✓	**3**	
		(ii)	damage to chlorophyll / reduction in pigment ✓ which will reduce the light dependent stage ✓ damage to membranes in chloroplast / reduction in sites for light capture ✓ which will reduce the light dependent stage ✓ damage to membranes in chloroplast / reduction in reaction sites for electron transfer ✓	**max 4**	**Award 1 mark for the alteration of the ultrastructure (max 2) and 1 further mark for details of its effect on photosynthesis (max 2)**

Question			Answer	Marks	Guidance
			which will reduce, photophosphorylation / ATP production in the light dependent stage ✓ damage to membrane around chloroplast / release of enzymes ✓ which will reduce, light independent stage / Calvin cycle ✓		
			Total	**19**	

Question			Answer	Marks	Guidance
19	**(a)**	**(i)**	sucrose is soluble so can be transported in sap ✓ but metabolically (relatively) inactive so no, used / removed, during transport ✓	**2**	
		(ii)	*similarity – one of* solutes carried in solution in both ✓ both carry mineral salts ✓ both use, mass flow / generated hydrostatic pressure ✓ *difference – one of* transport in phloem can take place in different directions **and** transport in xylem only takes place up the plant ✓ phloem carries carbohydrates **and** xylem does not ✓ phloem transport uses living cells **and** xylem does not ✓ xylem uses, capillary action / cohesion and adhesion, **and** phloem does not ✓	**max 2**	

Question			Answer	Marks	Guidance
	(b)	(i)	certain parts can store and then release carbohydrates when needed ✓ suitable examples include root or leaf, which can act as sink or source at different times of year ✓	2	
		(ii)*	**Level 3 (5–6 marks)** A thorough explanation, showing a good understanding of the principles of loading into phloem, incorporating use of the diagram. *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Level 2 (3–4 marks)** A partial explanation showing some understanding of the principles of loading into phloem. *There is a line of reasoning presented with some structure. The information presented is in the most-part relevant and supported by some evidence.* **Level 1 (1–2 marks)** An attempt including some correct principles, but likely to be confused, showing limited understanding of the principles of loading into phloem. *The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.* **0 marks** No response or no response worthy of credit.	6	**Indicative scientific content:** • **B** / sucrose**,** pumped from companion cell into phloem sieve tube • by active transport • H^+ / proton**,** co-transport of sucrose • reduces water potential of sieve tube • **A** / water**,** enters sieve tube from companion cell • **C** / water**,** enters sieve tube from xylem • increased pressure forces flow of sap down phloem • through the pores in the sieve plates.

Question			Answer	Marks	Guidance
	(c)	(i)	glycosidic ✓	1	
		(ii)	19 × greater in modified ✓ 1811% increase in modified compared with unmodified ✓ standard deviation indicates greater spread of data for modified ✓	max 2	
		(iii)	sucrose unloaded at sinks and invertase converts sucrose into, glucose / monosaccharide ✓ increases sucrose concentration gradient between phloem and sink ✓ causes increased unloading of sucrose from phloem ✓ *two from* increases solute gradient between source and sink ✓ removal of water from phloem increases pressure gradient between source and sink ✓ contributes to increased movement in phloem ✓	max 4	
		(iv)	modified produce fewer **and** larger tubers ✓ **ora** modified produce greater mass of tuber ✓ **ora** 109.34 g for modified **and** 89.04 g for not modified ✓	3	
			Total	22	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>20</td><td>(a)</td><td>(i)</td><td>two of:
ACTH
cortisol
adrenaline ✓</td><td>1</td><td>Two answers required for 1 mark</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>
<table>
<tr><th>Target cell</th><th>Response</th><th>Role in the ‘fight or flight’ response</th></tr>
<tr><td>Smooth muscle in bronchioles</td><td>muscle relaxes ✓</td><td>bronchioles dilate and allow more oxygen to reach blood ✓</td></tr>
<tr><td>Sino-atrial node</td><td>increases rate of firing impulses ✓</td><td>increased heart rate circulates blood more quickly ✓</td></tr>
<tr><td>Liver cell</td><td>increases glycogenolysis ✓</td><td>makes more glucose available for respiration ✓</td></tr>
</table>
</td><td>6</td><td></td></tr>
<tr><td></td><td></td><td>(iii)</td><td>catalyses synthesis of cyclic AMP from ATP ✓
cyclic AMP activates enzymes responsible for conversion of glycogen to glucose ✓</td><td>2</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance
		(iv)	prolonged high blood pressure can lead to cardiovascular problems ✓ prolonged high blood sugar can lead to, problems with blood sugar regulation / diabetes ✓ suppression of the immune system can lead to susceptibility to, disease / infection ✓	**max 2**	
	(b)	**(i)**	**D** pyruvate ✓ **E** lactate ✓	**2**	
		(ii)	is a hydrogen acceptor / removes hydrogen from reduced NAD ✓	**1**	
		(iii)	for glycolysis to take place, NAD / **G**, is needed ✓ there is a limited amount of NAD in the cell ✓ formation of, NAD / **G**, allows, glycolysis to continue / some ATP to be formed ✓	**max 2**	
		(iv)	liver **and** in the blood ✓	**1**	
	(c)		cells are able to tolerate, high levels of lactate / acidity / low pH ✓ have high phosphocreatine stores ✓ use of stored ATP ✓	**max 2**	
			Total	**19**	

Copyright information

Q19: Photograph of potato plant © permission from Universal Images Group Limited / Alamy

© Cambridge OCR 2026

Tell us what you think

Your feedback plays an important role in how we develop, market, support and resource qualifications now and into the future. We want you and your students to enjoy and get the best out of our qualifications and resources, but to do that we need your honest opinions to tell us whether we're on the right track or not.

You can email your thoughts to support@ocr.org.uk or visit our feedback page to learn more about how you can help us improve our qualifications.



Designing and testing in collaboration with teachers and students



Helping young people develop an ethical view of the world



Equality, diversity, inclusion and belonging (EDIB) are part of everything we do

---

Contact the team at:

01223 553998

ocr.org.uk

To stay up to date with all the relevant news about our qualifications, register for email updates at ocr.org.uk/updates

Visit our Online Support Centre at support.ocr.org.uk

Sign up for Teach Cambridge to access your planning, teaching and assessment support material.

CAMBRIDGE
UNIVERSITY PRESS & ASSESSMENT

Cambridge OCR is part of Cambridge University Press & Assessment, a department of the University of Cambridge.

Cambridge OCR is a Company Limited by Guarantee and an exempt charity. Registered in England.
Registered office: The Triangle Building, Shaftesbury Road, Cambridge, CB2 8EA. Registered company number: 3484466.

We operate academic and vocational qualifications regulated by Ofqual, Qualifications Wales and CCEA as listed in their qualifications registers.

We are committed to providing a fully accessible experience across all our products, platforms, and websites. Find out more about our accessibility standards.

© Cambridge OCR 2026. All rights reserved. We retain the copyright on all our publications. However, our registered centres are permitted to copy and distribute our material for their own internal use, in line with any specific restrictions detailed in the publication. Find out more about our copyright policies.

We update our publications regularly so please check you have the most up-to-date version.

We cannot be held responsible for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication and do not guarantee that any content on such websites is, or will remain, accurate or appropriate.

When we update our specifications, you'll see a new version number and a summary of the changes. While we do our best to reflect these changes in all associated resources on Teach Cambridge, if you notice any discrepancies, please refer to the latest specification on our website and let us know.

Our resources do not represent any teaching method we expect you to use. We cannot be held responsible for any errors or omissions in our resources.