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CAMBRIDGE
International Education

Cambridge International AS & A Level

BIOLOGY **9700/22**

Paper 2 AS Level Structured Questions **February/March 2026**

MARK SCHEME

Maximum Mark: 60

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 February/March 2026 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

This document consists of **17** printed pages.

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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 descriptions 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.

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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> 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.

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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.

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Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
	correct point or mark awarded
	correct awarding one mark from marking point or marking group 1. similar numbered ticks are used for marking point or marking groups 2, 3, 4 etc.
	incorrect point or mark not awarded
	working towards marking point
	information missing or insufficient for credit
	used to highlight part of an extended response
	used to highlight part of an extended response
	allow or accept
	benefit of the doubt given

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Annotation	Meaning
CON	contradiction in response, mark not awarded
ECF	error carried forward applied
I	incorrect or insufficient point ignored while marking the rest of the response
IRRL	irrelevant material that does not answer the question
O	or reverse argument
PAG	point already given
R	incorrect point or mark not awarded
SEEN	point has been noted, but no credit has been given or blank page seen

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Mark scheme abbreviations

;	separates marking points
/	alternative answers for the same point
A	accept (for answers correctly cued by the question, or by extra guidance)
R	reject
I	ignore
( )	the word / phrase in brackets is not required, but sets the context
AW	alternative wording (where responses vary more than usual)
underline	actual word given must be used by candidate (grammatical variants accepted)
max	indicates the maximum number of marks that can be given
ora	or reverse argument
mp	marking point (with relevant number)
ecf	error carried forward
AVP	alternative valid point

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1(a)</td><td>
<table>
<tr><th>feature</th><th>animal cell</th><th>plant cell</th></tr>
<tr><td>80S ribosomes in the cytoplasm</td><td>✓</td><td>✓</td></tr>
<tr><td>cell wall composed of peptidoglycan</td><td>×</td><td>×</td></tr>
<tr><td>large permanent vacuole</td><td>×</td><td>✓</td></tr>
</table>
;
;
;

one mark per correct row
if no marks gained, allow 1 mark for a correct column</td><td>3</td></tr>
</table>

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Question	Answer	Marks
1(b)(i)	*marking points must be in context of companion cell* *any **five** from*: **1** moves / pumps / actively transports, hydrogen ions / H^+ / protons, into the apoplast / into the cell wall / out of cytoplasm / out of companion cell **R** into sieve tube **or** proton pump creates proton gradient between, apoplast / cell wall, and cytoplasm / AW **;** **2** cotransporter protein for cotransport of sucrose and, hydrogen ions / H^+ / protons, into, cell **A** / companion cell **;** **3** plasmodesmata allow, diffusion / transfer / AW, of sucrose (from, cell **A** / companion cell) into (phloem) sieve tube (element) **;** **4** mitochondria produce ATP **;** **5** (many) ribosomes / rough endoplasmic reticulum**,** to produce (named) transport proteins / AW **;** **6** nucleus contains, genes / AW, coding for transport proteins **;** **7** AVP **;** e.g. example of need for ATP including for, proton pumping for synthesis of, transport proteins for synthesis of, phloem / P, proteins	**5**

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Question	Answer	Marks
1(b)(ii)	*any **four** from:* **1** mass flow **;** **2** (entry of sucrose) decreases water potential in sieve tube **;** **A** Ψ for water potential **3** water enters (sieve tubes), down water potential gradient / by osmosis **;** **4** increase in volume **;** **5** increase in / high(er), hydrostatic pressure **;** *hydrostatic not needed if given in mp 6* **6** unloading / removal, of sucrose and water at sink lowers hydrostatic pressure **;** *hydrostatic not needed if given in mp5* **7** movement (from source to sink) is down (hydrostatic) pressure gradient **;**	**4**

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Question	Answer	Marks
2(a)	*any **three** from*: good / universal, solvent **or** (is polar so) can dissolve (named) polar molecules / ions **;** **R** organic solvent transport, qualified **;** high specific heat capacity **;** stabilises / regulates / maintains, constant / AW, (blood) temperature **;** AVP **;** e.g. water is, liquid at body temperature / a fluid, so flows	**3**
2(b)	*any **two** from*: as, hydrogencarbonate (ions) / HCO_3^- **;** **A** bicarbonate for hydrogencarbonate dissolved in plasma **;** bound to haemoglobin / forms carbaminohaemoglobin **;** AVP **;** e.g. as carbonic acid in plasma	**2**

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Question	Answer	Marks
2(c)(i)	*any **four** from:* *similarities:* globular (proteins) **;** contain / AW, prosthetic group / conjugated protein / porphyrin ring / haem / iron / Fe^{2+} **;** contain / AW, alpha / α, helices **;** both have a tertiary structure **;** *differences:* myoglobin has one polypeptide **and** haemoglobin has four, polypeptides / subunits **;** myoglobin has no quaternary structure **and** haemoglobin has quaternary structure **;** myoglobin has one haem **and** haemoglobin has four haem (groups) **;** **A** prosthetic group(s) for haem AVP **;**	**4**
2(c)(ii)	*any **two** from:* (efficient / fast / AW) transfer of oxygen from haemoglobin to myoglobin **;** to allow muscle cells to, respire more quickly / produce more ATP / respire aerobically (for longer) **;** AVP **; ;** e.g. idea of oxygen stored in myoglobin reduces likelihood of building up oxygen debt maintain (steep) concentration gradient (from blood to muscle cells)	**2**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>3(a)(i)</td><td>middle monomer circled ;</td><td>1</td></tr>
<tr><td>3(a)(ii)</td><td>alpha / α ;</td><td>1</td></tr>
<tr><td>3(a)(iii)</td><td>
<table>
<tr><th>sugar</th><th>number of glycosidic bonds in one molecule</th><th>reducing sugar or non-reducing sugar</th></tr>
<tr><td>glucose</td><td>0</td><td>reducing ;</td></tr>
<tr><td>maltose</td><td>1</td><td>reducing ;</td></tr>
<tr><td>raffinose</td><td>2</td><td>non-reducing ;</td></tr>
</table>
one mark per correct row
if no row completely correct, allow one mark for correct column
</td><td>3</td></tr>
<tr><td>3(b)</td><td>(K_m =) 0.02 ;
(unit =) mol dm^{-3} ;</td><td>2</td></tr>
<tr><td>3(c)(i)</td><td>fatty acid ; A carboxylic acid / butanoic acid</td><td>1</td></tr>
<tr><td>3(c)(ii)</td><td>(react with) glycerol ;
plus any two from:
condensation reaction / formation of water ;
to form ester bond ;
ref. to two other fatty acids (react with glycerol) / total of three fatty acids ;
AVP ; e.g. further detail of reaction, e.g. reacts with –OH of glycerol</td><td>3</td></tr>
</table>

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Question	Answer	Marks
4(a)	RSV / it, is (disease) caused by a pathogen **;** (pathogen / RSV, is) transmissible **;** **A** communicable **I** contagious	**2**
4(b)	envelope **;** **A** phospholipid bilayer capsid **;**	**2**
4(c)(i)	smooth muscle **;**	**1**
4(c)(ii)	waft / move, mucus, away / up the bronchus / AW **;**	**1**
4(d)(i)	*monoclonal antibody:* passive **and** artificial **;** *vaccination:* active **and** artificial **;** **A** in either order for each treatment	**2**

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Question	Answer	Marks
4(d)(ii)	*any **four** from:* **1** (by) injecting (RSV) antigen into mice **;** **A** (other named) small mammal **2** (*idea of* time) for immune response to occur **;** **3** remove / produce, plasma cells / B-lymphocytes / B cells / splenocytes (from the spleen of mice) **;** **4** fuse, plasma cells / B-lymphocytes / B cells / splenocytes, and, myeloma / tumour / cancer / AW, cells **;** **5** use of fusogen / other named method **;** e.g. polyethylene glycol (PEG) **6** screen / select, hybridoma cells **;** **7** clone / make many copies of, (selected) hybridoma cells **;** **8** AVP **;** e.g. production / selection, of one, form of / AW, antibody against RSV antigen humanising antibody / antibody humanisation	**4**
4(d)(iii)	*any **one** from:* long-term immunity / ref. to memory cells / AW **;** may contain more than one antigen **;** AVP **;** e.g. can add adjuvants to obtain a stronger immune response monoclonal antibodies may be destroyed by an immune response	**1**

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Question	Answer	Marks
4(e)(i)	endocytosis occurs / described **;** e.g. (phagocyte cell surface) membrane, surrounds / AW, infected cells pseudopodia, surround / form around / AW, infected cell (alveolar) macrophage / phagocyte / (phagocytic) cell, envelops / engulfs, infected cells any other event leading to formation of phagocytic vacuole that occurs after detection of infected body cells **;** e.g. *before endocytosis:* ref. to chemotaxis / chemotactic response phagocyte receptors, bind / attach / join / AW, to viral antigens on cell surface membrane **I** binding to, macrophage / cell *after endocytosis:* membrane fusion / (phagocytic), vacuole pinches off / AW **A** vesicle for vacuole	**2**
4(e)(ii)	lysosome **;**	**1**

Question	Answer	Marks
5(a)(i)	*any **three** from:* addition of, activated / phosphorylated, nucleotides **;** **A** free nucleotides ref. to complementary, nucleotides / bases / strands **;** forms phosphodiester bonds (between adjacent nucleotides) **;** adds nucleotides to, elongating / growing, polynucleotide / strand / AW **;** ref. to proofreading ability of DNA polymerase **;**	**3**

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Question	Answer	Marks
5(a)(ii)	*any **two** from*: ref. to leading strand <u>and</u> lagging strand (in context of movement of DNA polymerase along each strand in opposite directions) **;** ref. to (Okazaki) fragments for lagging strand **;** (lagging strand) requires DNA ligase **;** AVP **;** e.g. DNA polymerase can only add nucleotides to the, 3 prime / 3′, end of the growing DNA strand	**2**
5(b)	*any **two** from:* **1** cell, cycle/regulation, checks, prevent tumour cell progressing to mitosis **;** **2** stop cell cycle in G_2 phase / at end of S phase **;** **3** ref. to rapidly dividing (tumour) cells will be most affected by etoposide **;** **4** ref to consequence of, cuts / damage, in DNA **;** e.g. may lead to tumour cell, death / apoptosis **5** DNA polymerase prevented from moving along strands so replication of tumour cell cannot occur **;** **6** AVP **;** e.g. can be attached to monoclonal antibodies (specific to tumour cells)	**2**

Question	Answer	Marks
6	carrier / channel **;** cholesterol **;** hydrophobic **;**	**3**

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