



Cambridge International AS & A Level

BIOLOGY**9700/43**

Paper 4 A Level Structured Questions

May/June 2023

MARK SCHEME

Maximum Mark: 100

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 2023 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

This document consists of **24** printed pages.

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.

PUBLISHED**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	<p><u>'List rule' guidance</u></p> <p>For questions that require <i>n</i> responses (e.g. State two reasons ...):</p> <ul style="list-style-type: none">• The response should be read as continuous prose, even when numbered answer spaces are provided.• Any response marked <i>ignore</i> in the mark scheme should not count towards <i>n</i>.• Incorrect responses should not be awarded credit but will still count towards <i>n</i>.• 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 <i>n</i> 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.

Mark scheme abbreviations:

;	separates marking points
/	alternative answers for the same marking point
R	reject
A	accept
I	ignore
AVP	any valid point
AW	alternative wording (where responses vary more than usual)
ecf	error carried forward
<u>underline</u>	actual word underlined must be used by candidate (grammatical variants accepted)
max	indicates the maximum number of marks that can be given
ora	or reverse argument

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Question	Answer	Marks
1(a)	<p>P – citrate A citric acid</p> <p>Q – NAD / NAD⁺</p> <p>R – reduced NAD / NADH A NADH₂</p> <p>S – carbon dioxide / CO₂</p> <p>T – FAD</p> <p>U – reduced FAD / FADH₂ ;;;</p> <p><i>6 correct = 3 marks</i> <i>5/4 correct = 2 marks</i> <i>3/2 correct = 1 mark</i></p>	3
1(b)	<p>any two from:</p> <p>1 transfer of phosphate group to ADP / ADP phosphorylated / ADP + P_i → ATP ;</p> <p>2 substrate-linked phosphorylation ; A substrate-level phosphorylation R if oxidative phosphorylation</p> <p>3 enzyme (catalysed reaction) ;</p>	2

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Question	Answer	Marks
1(c)	<p><i>any four from:</i></p> <ol style="list-style-type: none">1 small / water-soluble, so can move around <u>cell</u> ;2 loss of phosphate / hydrolysis, leads to energy release ;3 (release energy) immediately / in small packets or <i>ref.</i> 30.5 kJ (mol⁻¹) ;4 can be, recycled / regenerated or ATP ⇌ ADP + Pi ;5 link between energy-yielding and energy-requiring reactions / AW ;6 high turnover / described ;7 <i>ref to</i> ATPase ;	4

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Question	Answer	Marks
2	<p><i>any seven from:</i></p> <ol style="list-style-type: none"> 1 (random) mutation ; 2 directional selection ; 3 antibiotic acts as selection pressure / AW ; 4 bacteria with, mutation / gene / allele, (that codes for antibiotic resistance), have selective advantage ; 5 (so) survive / reproduce ; 6 <i>ref.</i> binary fission / asexual reproduction / vertical transmission ; 7 <i>ref.</i> transduction / transformation / conjugation / horizontal transmission ; I sexual reproduction 8 (resistance) allele frequency increases / gives rise to a population of resistant bacteria ; 9 fast (evolution) due to short generation time ; 10 increased chance of resistance if people do not finish full course of antibiotics / overuse of antibiotics ; 11 AVP ; e.g. some antibiotics may act as mutagens e.g. enzymes that break down the antibiotic 	7

Question	Answer	Marks									
3(a)(i)	<p><i>the operon has:</i></p> <p>promoter ;</p> <p>operator ;</p> <p>three structural genes / named three structural genes ;</p> <table border="1" data-bbox="721 486 1552 703"> <tr> <td><i>lacZ</i></td> <td>or</td> <td>β galactosidase <u>gene</u></td> </tr> <tr> <td><i>lacA</i></td> <td>or</td> <td>lactose / β galactoside, permease <u>gene</u></td> </tr> <tr> <td><i>lacY</i></td> <td>or</td> <td>transacetylase <u>gene</u></td> </tr> </table> <p><i>I regulatory genes / order of named parts</i></p>	<i>lacZ</i>	or	β galactosidase <u>gene</u>	<i>lacA</i>	or	lactose / β galactoside, permease <u>gene</u>	<i>lacY</i>	or	transacetylase <u>gene</u>	3
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<i>lacY</i>	or	transacetylase <u>gene</u>									
3(a)(ii)	<p><i>any four from:</i></p> <p><i>lacI gene</i></p> <p>1 is always expressed ;</p> <p>2 controls (structural) gene expression ;</p> <p>3 codes for the repressor (protein) ;</p> <p>4 repressor, binds to the operator / blocks the promoter ;</p> <p>5 prevents, (structural) gene expression / RNA polymerase binding to promoter ;</p> <p>6 lactose / allolactose, binds to repressor ;</p> <p>7 (so) repressor cannot bind to operator / promoter unblocked / gene expression can occur ;</p>	4									

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Question	Answer	Marks
3(b)	1 enzymes / proteins, made continuously / all the time ; 2 (because) enzymes / proteins, needed / necessary (for cell) ; 3 end product inhibition / made until product concentrations too high ;	3

Question	Answer	Marks
4(a)	any three from: 1 donor not needed ; 2 immediate effect ; 3 <i>idea that</i> easy to administer treatment ; 4 no immune response / no rejection ; 5 less invasive ; 6 AVP ; e.g. lower risk to health / cheaper / quicker	3

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Question	Answer	Marks
4(b)	<p><i>any four from:</i></p> <ol style="list-style-type: none"> 1 given a drug to increase number of stem cells (in bone marrow) ; 2 <i>ref. to virus / vector, containing, normal / healthy, allele ;</i> 3 remove, bone marrow / stem cells ; 4 mix stem cells with, viral / vector (to allow transfer of normal allele) ; 5 radiotherapy / drug, to make space in bone marrow / to kill stem cells (in bone marrow) ; 6 (transduced stem) cells, infused / injected, into blood ; 7 (lymphocytes) produce functioning ADA ; 8 AVP ; e.g. (gamma) retrovirus / adeno-associated virus e.g. tissue from bone marrow, purified / sorted, to obtain stem cells e.g. cells are grown in culture to check the ADA gene is active 	4

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Question	Answer	Marks
4(c)	<p><i>any three from:</i></p> <ol style="list-style-type: none"> 1 expensive ; 2 cure / long term treatment / no longer chronically ill / better quality of life ; 3 no need for regular, injections / treatments or only a single treatment ; 4 cultural / religious, objections ; 5 no donor needed ; 6 <i>ref.</i> more money available to health system in the long term ; 7 may cause cancer ; 8 stressful ; 	3

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Question	Answer						Marks																																				
5(a)	<table border="1" data-bbox="600 217 1675 692"> <thead> <tr> <th data-bbox="600 217 920 331">phenotype</th> <th data-bbox="920 217 1090 331">observed</th> <th data-bbox="1090 217 1256 331">expected</th> <th data-bbox="1256 217 1373 331">O – E</th> <th data-bbox="1373 217 1520 331">(O – E)²</th> <th data-bbox="1520 217 1675 331">$\frac{(O - E)^2}{E}$</th> </tr> </thead> <tbody> <tr> <td data-bbox="600 331 920 395">red with black spots</td> <td data-bbox="920 331 1090 395">279</td> <td data-bbox="1090 331 1256 395">281.25</td> <td data-bbox="1256 331 1373 395">–2.25</td> <td data-bbox="1373 331 1520 395">5.0625</td> <td data-bbox="1520 331 1675 395">0.018</td> </tr> <tr> <td data-bbox="600 395 920 459">white with black spots</td> <td data-bbox="920 395 1090 459">95</td> <td data-bbox="1090 395 1256 459">93.75</td> <td data-bbox="1256 395 1373 459">1.25</td> <td data-bbox="1373 395 1520 459">1.5625</td> <td data-bbox="1520 395 1675 459">0.017</td> </tr> <tr> <td data-bbox="600 459 920 523">red</td> <td data-bbox="920 459 1090 523">96</td> <td data-bbox="1090 459 1256 523">93.75</td> <td data-bbox="1256 459 1373 523">2.25</td> <td data-bbox="1373 459 1520 523">5.0625</td> <td data-bbox="1520 459 1675 523">0.054</td> </tr> <tr> <td data-bbox="600 523 920 592">white</td> <td data-bbox="920 523 1090 592">30</td> <td data-bbox="1090 523 1256 592">31.25</td> <td data-bbox="1256 523 1373 592">–1.25 ;</td> <td data-bbox="1373 523 1520 592">1.5625 ;</td> <td data-bbox="1520 523 1675 592">0.05(0)</td> </tr> <tr> <td colspan="5" data-bbox="600 592 1520 692"></td> <td data-bbox="1520 592 1675 692">0.139 / 0.14 ;</td> </tr> </tbody> </table> <p data-bbox="338 695 685 727"><i>one mark for each column</i></p>						phenotype	observed	expected	O – E	(O – E) ²	$\frac{(O - E)^2}{E}$	red with black spots	279	281.25	–2.25	5.0625	0.018	white with black spots	95	93.75	1.25	1.5625	0.017	red	96	93.75	2.25	5.0625	0.054	white	30	31.25	–1.25 ;	1.5625 ;	0.05(0)						0.139 / 0.14 ;	3
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5(b)	<p data-bbox="338 762 524 794"><i>any two from:</i></p> <p data-bbox="338 831 763 863"><i>accept null hypothesis (no mark)</i></p> <p data-bbox="338 900 1189 932">1 χ^2 value / 0.139 / 0.14, is lower than, the critical value / 7.815 ;</p> <p data-bbox="338 968 1391 1032">2 the observed numbers are not significantly different to the expected numbers (at $p = 0.05$) ;</p> <p data-bbox="338 1069 853 1101">3 any differences are due to chance ;</p> <p data-bbox="338 1137 584 1169"><i>allow ecf from 5(a)</i></p>						2																																				

Question	Answer				Marks	
5(c)	female gametes				4	
	male gametes	X^RB	X^rB	X^Rb		X^rb
	X^rB	X^RX^rBB	X^rX^rBB	X^RX^rBb		X^rX^rBb
		female	female	female		female
		red + black spots	white + black spots	red + black spots		white + black spots
	Y^RB	X^RY^RBB	X^rY^RBB	X^RY^RBb		X^rY^RBb
		male	male	male		male
		red + black spots	red + black spots	red + black spots		red + black spots
	X^rb	X^RX^rBb	X^rX^rBb	X^RX^rbb		X^rX^rbb
		female	female	female		female
		red + black spots	white + black spots	red + no spots		white + no spots
	Y^Rb	X^RY^RBb	X^rY^RBb	X^RY^Rbb		X^rY^Rbb
		male	male	male		male
		red + black spots	red + black spots	red + no spots		red + no spots

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Question	Answer	Marks
5(d)	<p><i>mark as pairs</i></p> <p>1 allele R / dominant red allele, is on Y chromosome ;</p> <p>2 (so all) males inherit, dominant red allele / allele R or only Y^R is present in the gametes ;</p> <p>3 no, allele r / recessive white allele, on Y chromosome or allele r only exists on the X chromosome ;</p> <p>4 (so) males never inherit, recessive white allele / allele r ;</p>	2
5(e)	<p>any two from:</p> <p>1 mutation ;</p> <p>2 detail of mutation ;</p> <p>3 crossing over ;</p> <p>4 (of) the R allele / dominant red allele, from a Y chromosome to an X chromosome ;</p>	2

Question	Answer	Marks
6(a)	<p>A – endothelial cell ;</p> <p>B – basement membrane ;</p> <p>C – podocyte ;</p>	3

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Question	Answer	Marks
6(b)	<p><i>any two from:</i></p> <p>1 acts as the filter ;</p> <p>2 prevents molecules more than 68 000 – 70 000 MM from passing through ; ora</p> <p>3 stops, large (plasma) proteins / red blood cells ;</p>	2
6(c)	<p>$\frac{180 - 1.4}{180} \times 100$</p> <p>or</p> <p>$\frac{178.6}{180} \times 100 ;$</p> <p>99.2 ;</p>	2

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Question	Answer	Marks
6(d)	<p><i>any seven from:</i></p> <ol style="list-style-type: none"> 1 ADH, acts as / is, a cell signalling molecule ; 2 ADH binds to receptors ; 3 on cell surface membrane (of collecting duct cells) ; I activates G protein 4 cAMP / second messenger, produced ; 5 enzyme cascade / activation of kinase ; 6 vesicles / aquaporins, phosphorylated / activated ; 7 vesicles (with aquaporins) move towards cell surface membrane ; 8 aquaporins added to (cell surface) membrane ; 9 increases, cell / membrane, permeability to water ; 10 water moves out (of collecting duct), by osmosis / description ; 11 into, (collecting duct) cells / tissue fluid / blood ; I water is reabsorbed as in Q 	7

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Question	Answer	Marks
7(a)	<p>any three from:</p> <ol style="list-style-type: none">1 opens (voltage-gated) Ca²⁺ channels in sarcoplasmic reticulum or calcium ions leave sarcoplasmic reticulum ;2 calcium ions bind to troponin ;3 troponin changes shape / tropomyosin moves ;4 exposes binding site on actin ;5 myosin <u>head</u>, binds to (binding) site / forms cross bridge ; <p>plus</p> <ol style="list-style-type: none">6 myosin <u>head</u>, tilts / AW ;7 pulls actin / power stroke (so sarcomere shortens) ;	4

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Question	Answer	Marks									
7(b)	<p><i>any two from:</i></p> <ol style="list-style-type: none"> 1 young mice have more (muscle fibres) that are smaller (in diameter) ; ora 2 young mice have smaller range (of diameters of muscle fibres) ; ora 3 comparative data quote ; e.g. <table border="1" data-bbox="719 488 1554 751"> <thead> <tr> <th></th> <th>number of muscle fibres at mean diameter / μm</th> <th>spread of diameters / μm</th> </tr> </thead> <tbody> <tr> <td>young mice</td> <td>35 at 30</td> <td>16–44</td> </tr> <tr> <td>adult mice</td> <td>16 at 50</td> <td>20–80</td> </tr> </tbody> </table> <p><i>plus</i> <i>any two from:</i></p> <p><i>young mice</i></p> <ol style="list-style-type: none"> 4 fewer, (muscle) fibres / myofibrils / sarcomeres ; ora 5 less, muscle protein / actin and myosin ; ora 6 so, weaker contraction / AW ; ora 		number of muscle fibres at mean diameter / μm	spread of diameters / μm	young mice	35 at 30	16–44	adult mice	16 at 50	20–80	4
	number of muscle fibres at mean diameter / μm	spread of diameters / μm									
young mice	35 at 30	16–44									
adult mice	16 at 50	20–80									

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Question	Answer	Marks										
8(a)	<table border="1" data-bbox="768 217 1507 547"> <thead> <tr> <th data-bbox="768 217 1299 280"></th> <th data-bbox="1299 217 1507 280">letter</th> </tr> </thead> <tbody> <tr> <td data-bbox="768 280 1299 344">high concentration of protons</td> <td data-bbox="1299 280 1507 344">M ;</td> </tr> <tr> <td data-bbox="768 344 1299 408">location of photosynthetic pigments</td> <td data-bbox="1299 344 1507 408">L or N ;</td> </tr> <tr> <td data-bbox="768 408 1299 472">site of light-independent stage</td> <td data-bbox="1299 408 1507 472">K ;</td> </tr> <tr> <td data-bbox="768 472 1299 547">site of light-dependent stage</td> <td data-bbox="1299 472 1507 547">L or N ;</td> </tr> </tbody> </table> <p data-bbox="338 584 651 616"><i>ignore M in the last row</i></p>		letter	high concentration of protons	M ;	location of photosynthetic pigments	L or N ;	site of light-independent stage	K ;	site of light-dependent stage	L or N ;	4
	letter											
high concentration of protons	M ;											
location of photosynthetic pigments	L or N ;											
site of light-independent stage	K ;											
site of light-dependent stage	L or N ;											
8(b)	<p data-bbox="338 647 533 679"><i>any four from:</i></p> <ol data-bbox="338 711 1507 1015" style="list-style-type: none"> any one named ; e.g. chlorophyll b / carotene / xanthophyll / carotenoids ; act as accessory pigments / part of antenna complex / part of light harvesting system ; absorb, light / photons ; pass <u>energy</u> on to, chlorophyll a / primary pigment / reaction centre ; absorb different wavelengths of light / wavelengths not absorbed by chlorophyll a ; 	4										

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Question	Answer	Marks																																						
8(c)	<p>1 absorption higher for (whole) chloroplasts (throughout) ;</p> <p>2 comparative data quote or greatest difference at 525 / 530 nm ;</p> <table border="1" data-bbox="779 352 1496 1241"> <thead> <tr> <th data-bbox="779 352 969 520" rowspan="2">wavelength / nm</th> <th colspan="2" data-bbox="969 352 1496 453">absorbance / au ±0.05</th> </tr> <tr> <th data-bbox="969 453 1214 520">whole</th> <th data-bbox="1214 453 1496 520">pigment</th> </tr> </thead> <tbody> <tr><td data-bbox="779 520 969 584">500</td><td data-bbox="969 520 1214 584">9.2</td><td data-bbox="1214 520 1496 584">6.4</td></tr> <tr><td data-bbox="779 584 969 647">510</td><td data-bbox="969 584 1214 647">8.4</td><td data-bbox="1214 584 1496 647">3.8</td></tr> <tr><td data-bbox="779 647 969 711">520</td><td data-bbox="969 647 1214 711">7.4</td><td data-bbox="1214 647 1496 711">2.3</td></tr> <tr><td data-bbox="779 711 969 775">525</td><td data-bbox="969 711 1214 775">7.0</td><td data-bbox="1214 711 1496 775">1.95</td></tr> <tr><td data-bbox="779 775 969 839">530</td><td data-bbox="969 775 1214 839">6.6</td><td data-bbox="1214 775 1496 839">1.85</td></tr> <tr><td data-bbox="779 839 969 903">540</td><td data-bbox="969 839 1214 903">6.2</td><td data-bbox="1214 839 1496 903">2.05</td></tr> <tr><td data-bbox="779 903 969 967">550</td><td data-bbox="969 903 1214 967">5.8</td><td data-bbox="1214 903 1496 967">2.35</td></tr> <tr><td data-bbox="779 967 969 1031">560</td><td data-bbox="969 967 1214 1031">5.8</td><td data-bbox="1214 967 1496 1031">2.7</td></tr> <tr><td data-bbox="779 1031 969 1094">600</td><td data-bbox="969 1031 1214 1094">6.65</td><td data-bbox="1214 1031 1496 1094">4.7</td></tr> <tr><td data-bbox="779 1094 969 1158">650</td><td data-bbox="969 1094 1214 1158">8.85</td><td data-bbox="1214 1094 1496 1158">8.1</td></tr> <tr><td data-bbox="779 1158 969 1238">670</td><td data-bbox="969 1158 1214 1238">9.6</td><td data-bbox="1214 1158 1496 1238">9.2</td></tr> </tbody> </table> <p>3 (because) pigments arranged for better absorption in chloroplasts / thylakoid membranes are stacked / AW ;</p> <p>4 (because) chloroplasts contain more pigments ;</p>	wavelength / nm	absorbance / au ±0.05		whole	pigment	500	9.2	6.4	510	8.4	3.8	520	7.4	2.3	525	7.0	1.95	530	6.6	1.85	540	6.2	2.05	550	5.8	2.35	560	5.8	2.7	600	6.65	4.7	650	8.85	8.1	670	9.6	9.2	4
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Question	Answer	Marks
9(a)(i)	<p><i>any four from:</i></p> <ol style="list-style-type: none"> 1 (dopamine) diffuses across synaptic cleft ; 2 binds to receptors ; 3 on postsynaptic <u>membrane</u> ; 4 Na⁺ channels open R voltage gated channels or influx of Na⁺ into post synaptic neurone ; 5 depolarisation of postsynaptic <u>membrane</u> ; 6 <i>ref.</i> threshold ; 	4
9(a)(ii)	dopaquinone ; A melanin	1
9(b)	<p><i>any three from:</i></p> <ol style="list-style-type: none"> 1 Cl⁻ influx makes (inside of postsynaptic neurone) more negative / stays negative ; 2 hyperpolarisation / remains polarised ; 3 (not enough Na⁺ enter so) less likely to reach threshold ; 4 no depolarisation of (postsynaptic) membrane ; 5 (so) no action potential ; 	3

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Question	Answer	Marks																																								
10(a)	<p><i>any four from:</i></p> <table border="1" data-bbox="521 284 1715 810"> <thead> <tr> <th></th> <th data-bbox="568 284 1095 349">Animalia</th> <th></th> <th data-bbox="1189 284 1715 349">Plantae</th> <th></th> </tr> </thead> <tbody> <tr> <td data-bbox="521 349 568 413">1</td> <td data-bbox="568 349 1095 413">no cell walls</td> <td data-bbox="1095 349 1189 413">and</td> <td data-bbox="1189 349 1715 413">cell walls</td> <td data-bbox="1715 349 1749 413">;</td> </tr> <tr> <td data-bbox="521 413 568 478">2</td> <td data-bbox="568 413 1095 478">no, chlorophyll / chloroplasts</td> <td data-bbox="1095 413 1189 478">and</td> <td data-bbox="1189 413 1715 478">chlorophyll / chloroplasts</td> <td data-bbox="1715 413 1749 478">;</td> </tr> <tr> <td data-bbox="521 478 568 544">3</td> <td data-bbox="568 478 1095 544">heterotroph</td> <td data-bbox="1095 478 1189 544">and</td> <td data-bbox="1189 478 1715 544">autotroph / photosynthesis</td> <td data-bbox="1715 478 1749 544">;</td> </tr> <tr> <td data-bbox="521 544 568 609">4</td> <td data-bbox="568 544 1095 609">glycogen</td> <td data-bbox="1095 544 1189 609">and</td> <td data-bbox="1189 544 1715 609">starch</td> <td data-bbox="1715 544 1749 609">;</td> </tr> <tr> <td data-bbox="521 609 568 675">5</td> <td data-bbox="568 609 1095 675">nervous system</td> <td data-bbox="1095 609 1189 675">and</td> <td data-bbox="1189 609 1715 675">no nervous system</td> <td data-bbox="1715 609 1749 675">;</td> </tr> <tr> <td data-bbox="521 675 568 740">6</td> <td data-bbox="568 675 1095 740">move from place to place</td> <td data-bbox="1095 675 1189 740">and</td> <td data-bbox="1189 675 1715 740">unable to move from place to place</td> <td data-bbox="1715 675 1749 740">;</td> </tr> <tr> <td data-bbox="521 740 568 805">7</td> <td data-bbox="568 740 1095 805">no, permanent / central, vacuole</td> <td data-bbox="1095 740 1189 805">and</td> <td data-bbox="1189 740 1715 805">permanent / central, vacuole</td> <td data-bbox="1715 740 1749 805">;</td> </tr> </tbody> </table>		Animalia		Plantae		1	no cell walls	and	cell walls	;	2	no, chlorophyll / chloroplasts	and	chlorophyll / chloroplasts	;	3	heterotroph	and	autotroph / photosynthesis	;	4	glycogen	and	starch	;	5	nervous system	and	no nervous system	;	6	move from place to place	and	unable to move from place to place	;	7	no, permanent / central, vacuole	and	permanent / central, vacuole	;	4
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10(b)(i)	$\frac{0.86 - 0.28}{4} \text{ or } \frac{0.58}{4} ;$ <p>0.15 ;</p> <p>or</p> $\frac{0.85 - 0.28}{4} \text{ or } \frac{0.57}{4} ;$ <p>0.14 ;</p> <p><i>Allow ecf if divided by 5 and equals 0.12</i></p>	2																																								

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Question	Answer	Marks
10(b)(ii)	<i>any three from:</i> 1 climate change / described ; 2 less food / less watermilfoil ; 3 less, snow / cover, so more predation ; 4 more hunting ; 5 increased competition ; 6 loss of habitat / deforestation ; 7 (new) disease ;	3