

Biology A

General Certificate of Secondary Education

Unit **A222/02**: Modules B4, B5, B6 (Higher Tier)

Mark Scheme for January 2013

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.










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Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
not/reject	answers which are not worthy of credit
ignore	statements which are irrelevant - applies to neutral answers
allow/accept	answers that can be accepted
(words)	words which are not essential to gain credit
<u>words</u>	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	credit alternative wording / or words to that effect
ORA	or reverse argument

Available in scoris to annotate scripts:

	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	no benefit of doubt

	reject
	correct response
	draw attention to particular part of candidate's response
	information omitted

Subject-specific Marking Instructions

- a. Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).
- b. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

e.g. for a one-mark question where ticks in the third and fourth boxes are required for the mark:

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

*This would be worth
1 mark.*

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

*This would be worth
0 marks.*

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

*This would be worth
1 mark.*

- c. The list principle:
If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, e.g. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

d. Marking method for tick-box questions:

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.

If there is at least one tick, ignore crosses and other markings. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses. Credit should be given according to the instructions given in the guidance column for the question. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

e.g. if a question requires candidates to identify cities in England:

Edinburgh	<input type="checkbox"/>
Manchester	<input type="checkbox"/>
Paris	<input type="checkbox"/>
Southampton	<input type="checkbox"/>

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

- e. For answers marked by levels of response:
- i. **Read through the whole answer from start to finish**
 - ii. **Decide the level that best fits** the answer – match the quality of the answer to the closest level descriptor
 - iii. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

- iv. Use the **L1, L2, L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

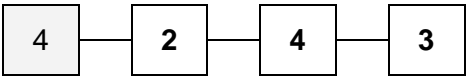
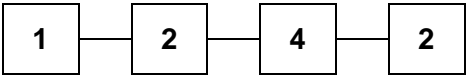
Question		Answer	Marks	Guidance
1	(a)	brain skin brain	2	3 correct = 2 marks 2 correct = 1 mark 1 or 0 correct = 0 marks
	(b)	respiring	1	accept any clear response eg. underlined
	(c)		2	
Total			5	

Question		Answer	Marks	Guidance						
2	(a)	<p>...proteins that slow down chemical reactions in cells.</p> <p>...proteins that speed up chemical reactions in cells.</p> <p>...carbohydrates that slow down chemical reactions in cells.</p> <p>...carbohydrates that speed up chemical reactions in cells.</p>	<table border="1"> <tr><td></td></tr> <tr><td>✓</td></tr> <tr><td></td></tr> <tr><td></td></tr> </table>		✓			<p>1</p> <p>more than one response = 0 marks</p> <p>accept a clear response eg underline the correct sentence, use a single cross, shade the box</p>		
✓										
	(b)	<table border="1"> <tr> <td>B</td> <td>C</td> <td>E</td> <td>A</td> </tr> </table>	B	C	E	A	2	<p>C before E = 1 mark</p> <p>E before A = 1 mark</p>		
B	C	E	A							
	(c)	<p>...affects the collision rate between the enzymes and the molecules.</p> <p>...affects the shape of the active site of the enzyme.</p> <p>...is dependant on temperature.</p> <p>...only affects the substrate molecules.</p>	<table border="1"> <tr><td></td></tr> <tr><td>✓</td></tr> <tr><td></td></tr> <tr><td></td></tr> </table>		✓			<p>1</p> <p>more than one response = 0 marks</p> <p>accept a clear response eg underline the correct sentence, use a single cross, shade the box</p>		
✓										
	(d)	<table border="1"> <tr> <td>right</td> <td>wrong</td> </tr> <tr> <td>Helen</td> <td>Kiran</td> </tr> <tr> <td>Cheryl</td> <td>James</td> </tr> </table>	right	wrong	Helen	Kiran	Cheryl	James	2	<p>all four correct = 2 marks</p> <p>two or three correct = 1 mark</p> <p>1 or 0 correct = 0 marks</p> <p>if a name appears in both boxes – incorrect response (one response cancels out the other)</p>
right	wrong									
Helen	Kiran									
Cheryl	James									
	(e)	<p><i>any three from:</i></p> <p>poison has same shape (as the substrate) (1)</p> <p>poison changes the shape of the enzyme/active site(1)</p> <p>poison fits into active site (1)</p> <p>stops substrate/reactant from attaching to enzyme (1)</p>	3							
		Total	9							

Question		Answer	Marks	Guidance				
3	(a)	<p>A <input type="text" value="fertilisation (1)"/></p> <p>B <input type="text" value="mitosis (1)"/></p> <p>C <input type="text" value="mitosis (1)"/></p>	3	<p>if more than 3 responses deduct one mark for each additional response</p> <p>accept another clear correct response eg lines linking the correct term to each box</p>				
	(b)	<p>...double that found in the parent cells. <input type="checkbox"/></p> <p>...the same as that found in the parent cells. <input type="checkbox"/></p> <p>...half that found in the parent cells. <input checked="" type="checkbox"/></p>	1	<p>more than one response = 0 marks</p> <p>accept another clear correct response eg a cross</p>				
	(c)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">D</td> <td style="text-align: center;">B</td> <td style="text-align: center;">A</td> <td style="text-align: center;">C</td> </tr> </table>	D	B	A	C	2	<p>B before A = 1 mark</p> <p>A before C = 1 mark</p>
D	B	A	C					
Total			6					

Question		Answer	Marks	Guidance
4	(a)	Rupert (1) Jemma (1)	2	
	(b)	meristem/ cambium	1	
Total			3	

Question		Answer	Marks	Guidance												
5	(a)	<p>...fully permeable to all molecules.</p> <p>...not permeable to any molecules.</p> <p>...not permeable to water molecules.</p> <p>...partially permeable.</p>	<table border="1"> <tr><td><input type="checkbox"/></td></tr> <tr><td><input type="checkbox"/></td></tr> <tr><td><input type="checkbox"/></td></tr> <tr><td><input checked="" type="checkbox"/></td></tr> </table>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	<p>more than 1 response = 0 marks</p> <p>accept any other clear response eg cross, shaded or ring around partially permeable or box, underlined etc.</p>							
<input type="checkbox"/>																
<input type="checkbox"/>																
<input type="checkbox"/>																
<input checked="" type="checkbox"/>																
	(b)	<table border="1"> <thead> <tr> <th></th> <th>Decreases</th> <th>Stays the same</th> <th>Increases</th> </tr> </thead> <tbody> <tr> <td>... pure water</td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>...sucrose solution</td> <td>✓</td> <td></td> <td></td> </tr> </tbody> </table>		Decreases	Stays the same	Increases	... pure water			✓	...sucrose solution	✓			2	<p>one mark for each correct row minus 1 mark for each additional tick in each row</p> <p>accept any other clear indication of correct response</p>
	Decreases	Stays the same	Increases													
... pure water			✓													
...sucrose solution	✓															
	(c) (i)	<p>any two from: movement of water (molecules); (1) from high solvent to low solvent concentration OR low solute to high solute concentration; (1) through a partially permeable membrane. (1)</p>	2	<p>accept from a dilute to a concentrated solution ignore from high concentration to low concentration (unqualified) accept semi-permeable</p>												
	(ii)	<p>diffusion includes molecules other than water; (1) partially permeable membrane not involved; (1)</p>	2													
Total			7													

Question		Answer	Marks	Guidance
6	(a)		1	all correct in the sequence = 1 mark
	(b)		1	all correct in the sequence = 1 mark
	(c)	1	1	more than one response = 0 marks
Total			3	

Question		Answer	Marks	Guidance
7	(a) (i)	Shoot B stops growing. Shoot A grows to the left. Shoot C grows to the right.	1	all correct responses = 1 mark accept any other clear response eg lines linking letters to boxes
	(ii)	Peta Nick	1	accept correct responses in either order accept any other clear response eg lines linking names to spaces, rings around correct names
	(b)	idea that plant stems or shoots <u>grow</u> towards <u>light</u> (1) (light needed) for <u>photosynthesis</u> / to make <u>food</u> (1) plants are <u>competing better</u> / <u>gain an advantage</u> (1)	3	ignore bend/move towards light ignore unqualified reference to increased survival
Total			5	

Question		Answer	Marks	Guidance												
8	(a)	<table border="1"> <tr> <td>C</td> <td>dog salivates</td> <td>dog given food</td> </tr> </table>	C	dog salivates	dog given food	2	C before B (1 mark), B before A (1 mark) if more than two responses – deduct 1 mark for each additional response accept clear indication of correct response eg. use of arrows									
		C	dog salivates	dog given food												
		<table border="1"> <tr> <td>B</td> <td>dog salivates</td> <td>dog given food</td> </tr> </table>	B	dog salivates	dog given food											
B	dog salivates	dog given food														
<table border="1"> <tr> <td>A</td> <td>dog salivates</td> <td>dog given food</td> </tr> </table>	A	dog salivates	dog given food													
A	dog salivates	dog given food														
	(b)	<table border="1"> <thead> <tr> <th></th> <th>True</th> <th>False</th> </tr> </thead> <tbody> <tr> <td>The bell was used ...</td> <td></td> <td>✓</td> </tr> <tr> <td>The dog learned ...</td> <td>✓</td> <td></td> </tr> <tr> <td>The conditioned reflex ...</td> <td></td> <td>✓</td> </tr> </tbody> </table>		True	False	The bell was used ...		✓	The dog learned ...	✓		The conditioned reflex ...		✓	2	three rows correct = 2 marks two rows correct = 1 mark one or zero rows correct = 0 marks accept a clear indication of correct response eg. shaded, circled accept crosses in correct boxes – instead of ticks
	True	False														
The bell was used ...		✓														
The dog learned ...	✓															
The conditioned reflex ...		✓														
		Total	4													
		Paper Total	42													

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