

Biology A

General Certificate of Secondary Education

Unit **A222/01**: Modules B4, B5, B6 (Foundation 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:

✗
✗

*This would be worth
1 mark.*

✓
✗

*This would be worth
0 marks.*

✗
✗
✓
✓

*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)	<table border="1"> <tr><td>homeopathy</td><td><input type="checkbox"/></td></tr> <tr><td>homogenised</td><td><input type="checkbox"/></td></tr> <tr><td>homeostasis</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>homologous</td><td><input type="checkbox"/></td></tr> </table>	homeopathy	<input type="checkbox"/>	homogenised	<input type="checkbox"/>	homeostasis	<input checked="" type="checkbox"/>	homologous	<input type="checkbox"/>	1	if more than one box ticked then minus one for each additional box. Candidate cannot score less than 0		
homeopathy	<input type="checkbox"/>													
homogenised	<input type="checkbox"/>													
homeostasis	<input checked="" type="checkbox"/>													
homologous	<input type="checkbox"/>													
	(b)	<table border="1"> <tr><td>hair growth</td><td><input type="checkbox"/></td></tr> <tr><td>body temperature</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>water and salt balance</td><td><input checked="" type="checkbox"/></td></tr> </table>	hair growth	<input type="checkbox"/>	body temperature	<input checked="" type="checkbox"/>	water and salt balance	<input checked="" type="checkbox"/>	1	both are needed for one mark if three boxes ticked then max 1 mark				
hair growth	<input type="checkbox"/>													
body temperature	<input checked="" type="checkbox"/>													
water and salt balance	<input checked="" type="checkbox"/>													
	(c)	<table border="1"> <tr><td>camping in winter</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>sitting reading a book</td><td><input type="checkbox"/></td></tr> <tr><td>sleeping</td><td><input type="checkbox"/></td></tr> <tr><td>running a marathon</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>watching the television</td><td><input type="checkbox"/></td></tr> </table>	camping in winter	<input checked="" type="checkbox"/>	sitting reading a book	<input type="checkbox"/>	sleeping	<input type="checkbox"/>	running a marathon	<input checked="" type="checkbox"/>	watching the television	<input type="checkbox"/>	2	if more than two boxes ticked then minus one for each additional box. Candidate cannot score less than 0
camping in winter	<input checked="" type="checkbox"/>													
sitting reading a book	<input type="checkbox"/>													
sleeping	<input type="checkbox"/>													
running a marathon	<input checked="" type="checkbox"/>													
watching the television	<input type="checkbox"/>													
	(d) (i)	'receptor' in box labelling the fingertip (1) 'processing centre' in box labelling brain (1) 'effector' in box labelling arm muscle (1)	3											
	(ii)	arrow drawn from hand to brain (1)	1											
	(e)	change in environment; increases survival chances; avoids unfavourable conditions / stays in favourable conditions;	3	Accept example e.g. hearing / seeing / touch / smell / taste / hot / cold										
Total			11											

Question		Answer	Marks	Guidance						
2	(a)	<table border="1"> <tr> <td>A</td> <td>fertilisation</td> </tr> <tr> <td>B</td> <td>mitosis</td> </tr> <tr> <td>C</td> <td>mitosis</td> </tr> </table>	A	fertilisation	B	mitosis	C	mitosis	3	
A	fertilisation									
B	mitosis									
C	mitosis									
	(b)	<p>...double that found in the parent cells.</p> <p>...the same as that found in the parent cells.</p> <p>... half that found in the parent cells.</p> <table border="1"> <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 checked="" type="checkbox"/>	1	<p>more than one response = 0 marks</p> <p>accept another clear correct response eg. a cross</p>			
<input type="checkbox"/>										
<input type="checkbox"/>										
<input checked="" type="checkbox"/>										
	(c)	<table border="1"> <tr> <td>D</td> <td>B</td> <td>A</td> <td>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
3	(a)	Rupert; Jemma;	2	
	(b)	meristems / cambium	1	
Total			3	

Question		Answer	Marks	Guidance												
4	(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" style="margin-left: auto; margin-right: auto;"> <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" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>Decreases</td> <td>Stays the same</td> <td>Increases</td> </tr> <tr> <td>... pure water</td> <td></td> <td></td> <td style="text-align: center;">✓</td> </tr> <tr> <td>...sucrose solution</td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> </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:</p> <p>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</p>												
	(ii)	<p>diffusion includes molecules other than water; partially permeable membrane not involved;</p>	2													
		Total	7													

Question			Answer	Marks	Guidance								
5	(a)	(i)	peripheral nervous system	1	more than one response (0)								
		(ii)	muscle cells	1	more than one response (0)								
	(b)	(i)	<p>...CNS to the effectors. ...CNS to the receptors. ...effectors to the CNS. ...receptors to the CNS.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td style="text-align: center;">✓</td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> <tr><td style="text-align: center;"> </td></tr> </table>	✓				1	<p>more than one response (0)</p> <p>accept any other clear indication of correct response eg crosses, shading, linking lines etc.</p>				
✓													
		(ii)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Structure</th> <th>Letter</th> </tr> </thead> <tbody> <tr> <td>axon</td> <td>C</td> </tr> <tr> <td>fatty sheath</td> <td>B</td> </tr> <tr> <td>nucleus</td> <td>D</td> </tr> </tbody> </table>	Structure	Letter	axon	C	fatty sheath	B	nucleus	D	2	<p>3 correct (2) 2 correct (1) 1 or 0 correct (0)</p>
Structure	Letter												
axon	C												
fatty sheath	B												
nucleus	D												
	(c)		any 2 reflexes = 1 mark each; survival explanation 1; survival explanation 2;	4	<p>Examples include grasping, sucking, not breathing under water stops them falling, feeding, stops drowning in uterus</p>								
	(d)		0.26	1									
Total				10									

Question		Answer	Marks	Guidance
6	(a)	phototropism	1	more than one response = 0 marks accept phonetic spelling options
	(b)	<p>...give the plant more water.</p> <p>...give the plant a light source from above.</p> <p>...grow the plant next to another plant.</p> <p>...grow the plant in the same position but in a brighter light.</p>	1	<p>more than one response = 0 marks</p> <p>accept any clear response eg underline the correct sentence, use of a single cross, shade the box</p>
	(c)	<p>hormones (1)</p> <p>roots (1)</p> <p>unspecialised (1)</p>	3	<p>1 mark per correct response in each sentence</p> <p>response is incorrect if more than one word per line</p>
		Total	5	
		Paper Total	42	

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