

**Biology A**

General Certificate of Secondary Education

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

**Mark Scheme for January 2011**

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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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## Guidance for Examiners

Additional Guidance within any mark scheme takes precedence over the following guidance.
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1. Mark strictly to the mark scheme.
2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.
3. Accept any clear, unambiguous response which is correct, eg mis-spellings if phonetically correct (but check additional guidance).
4. Abbreviations, annotations and conventions used in the detailed mark scheme:

/	= alternative and acceptable answers for the same marking point
(1)	= separates marking points
<b>not/reject</b>	= answers which are not worthy of credit
<b>ignore</b>	= statements which are irrelevant - applies to neutral answers
<b>allow/accept</b>	= 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	= alternative wording
ORA	= or reverse argument

eg mark scheme shows 'work done in lifting/(change in) gravitational potential energy' (1)

"work done" = 0 marks

"work done lifting" = 1 mark

"change in potential energy" = 0 marks

"gravitational potential energy" = 1 mark

5. If a candidate alters his/her response, examiners should accept the alteration.

6. 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.

The example below illustrates how to apply this principle to an objective question.

*eg for a one mark question, where ticks in boxes 3 and 4 are required for the mark*

Put ticks (✓) in  
the two correct  
boxes.

✓
<del>ABC</del>

*This would be  
worth zero marks.*

Put ticks (✓) in  
the two correct  
boxes.

<del>ABC</del>
<del>ABC</del>

*This would be  
worth one mark.*

Put ticks (✓) in  
the two correct  
boxes.

<del>ABC</del>
<del>ABC</del>
✓
✓

*This would be  
worth one mark.*

7. 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, eg 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.

## 8. Marking method for tick boxes:

Always check the additional guidance.

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. If there are no ticks, accept clear, unambiguous indications, eg shading or crosses.

Credit should be given for each box correctly ticked. 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.

*eg if a question requires candidates to identify a city in England, then in the boxes*

Edinburgh	
Manchester	
Paris	
Southampton	

*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		✓		✓	✓		✓	
<b>Score:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>NR</b>

Question		Expected Answers			Marks	Additional Guidance
1	a		Kidneys reabsorb <b>all</b> . . .	Kidneys reabsorb as much. . .	[2]	Three rows correct = 2 marks Two rows correct = 1 mark One or zero rows correct = 0 marks
		Salt		✓		
		Sugar	✓			
		Water		✓		
	b			<input type="checkbox"/> amount of salt in the blood (1) <input checked="" type="checkbox"/> drinking fluids (1) <input type="checkbox"/> <input type="checkbox"/>	[2]	One mark for each correct response More than two responses – delete 1 mark for each error <b>Ignore</b> crosses in rows 1, 4 and 5
<b>Total</b>					[4]	

Question		Expected Answers				Marks	Additional Guidance
2	a	movement of <u>molecules/particles</u> (1) from a region of their high concentration to a region of their low concentration (1)				[2]	OWTTE
	b		moves <b>into</b> the cell	moves <b>out</b> of the cell	<b>no</b> overall movement	[1]	All three for 1 mark
		oxygen	✓				
		carbon dioxide		✓			
		dissolved food	✓				
	c	water dilute concentrated partially permeable				[2]	Responses must be in the correct order  Four correct response = 2 marks Two or three correct responses = 1 mark One or zero correct responses = 0 marks
<b>Total</b>						[5]	

Question		Expected Answers	Marks	Additional Guidance												
3	a	homeostasis (1)	[1]	More than 1 response = 0 marks <b>Accept</b> any other indication of a correct response												
	b	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>part of the space suit</th> <th>part of the body</th> <th>function</th> </tr> </thead> <tbody> <tr> <td>temperature probe</td> <td>brain</td> <td>detects the temperature</td> </tr> <tr> <td>heating system</td> <td>effector</td> <td>processing centre</td> </tr> <tr> <td>control circuit</td> <td>receptor</td> <td>produces the response</td> </tr> </tbody> </table>	part of the space suit	part of the body	function	temperature probe	brain	detects the temperature	heating system	effector	processing centre	control circuit	receptor	produces the response	[2]	Left hand side correct = 1 mark Right hand side correct = 1 mark
part of the space suit	part of the body	function														
temperature probe	brain	detects the temperature														
heating system	effector	processing centre														
control circuit	receptor	produces the response														
	c i	rate of reaction increases (1)  molecules move faster (1) increased frequency (and energy) of collisions/ more collisions/ successful collisions/ energetic collisions (between molecules) (1)	[3]	OWTTE <b>Accept</b> bigger/more/larger  <b>Accept</b> particles = molecules <b>Accept</b> correct ref. to kinetic energy <b>Accept</b> correct ref. to enzyme/substrate complexes <b>Reject</b> unqualified 'more energy'												
	ii	sweating (1)	[1]	More than 1 response = 0 marks												
<b>Total</b>			[7]													

Question		Expected Answers	Marks	Additional Guidance
4	a	double; nucleus; cytoplasm	[2]	Responses must be in the correct order.  Three correct responses = 2 marks Two correct responses = 1 mark One or zero correct responses = 0 marks
	b	<p style="text-align: center;"><b>number of types of bases</b></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; width: 100px; height: 40px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; width: 100px; height: 40px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; width: 100px; height: 40px; margin-bottom: 10px; text-align: center;">four</div> </div> <p style="text-align: center;"><b>joined together</b></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; width: 100px; height: 40px; margin-bottom: 10px; text-align: center;">in twos</div> <div style="border: 1px solid black; width: 100px; height: 40px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; width: 100px; height: 40px; margin-bottom: 10px;"></div> </div>	[1]	More than one response = 0 marks
	c	i	[2]	OWTTE <b>Accept</b> part/ open up = separate  <b>Accept</b> correct references to mRNA production
		ii	[1]	More than one response = 0 marks
<b>Total</b>			[6]	

Question		Expected Answers	Marks	Additional Guidance
5	a	brain (1) spinal cord (1)	[2]	More than two responses – deduct 1 mark for each additional response.
	b	axon (1) cell membrane (1) increases (1)	[3]	Responses must be in the correct order.
	c	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; width: 100px; text-align: center;">receptor</div> <div style="border: 1px solid black; padding: 5px; width: 100px; text-align: center;">sensory neuron</div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 100px; text-align: center;">effector</div> <div style="border: 1px solid black; padding: 5px; width: 100px; text-align: center;">spinal cord</div> </div>	[2]	<b>Accept</b> phonetic spellings  Four correct responses = 2 marks Two or three correct responses = 1 mark One or zero correct responses = 0 marks
<b>Total</b>			[7]	
6	a	George (1) Charley (1)	[2]	More than two responses – deduct 1 mark for each additional response <b>Accept</b> any order of response <b>Accept</b> any other indication of a correct response
	b	meristem/ cambium (1)	[1]	<b>Accept</b> phonetic spelling
	c	any named correct tissue eg xylem/phloem (1) any named correct organ eg leaf/flower/stem/root (1)	[2]	
<b>Total</b>			[5]	

Question		Expected Answers	Marks	Additional Guidance
7	a	electrical stimulation (1)	[1]	More than 1 response = 0 marks
	b	i	[1]	More than 1 response = 0 marks
		<p>... storage and retrieval of information.</p> <p style="text-align: right;"> <input type="checkbox"/>  <input checked="" type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> </p>		
		ii	[2]	<p>OWTTE</p> <p>It must be a process.</p> <p><b>Accept</b> any alternative correct credible answer eg sight, hearing, touch, smell, taste, learning, receive or respond to a stimulus, communicating, processing information.</p> <p><b>Reject</b> memory, as memory/retrieval/storage is in stem of question.</p> <p><b>Reject</b> reflexes, response (alone). reaction (alone), nerve impulses, effector, receptor, processing centre.</p>
<b>Total</b>			<b>[4]</b>	

Question		Expected Answers	Marks	Additional Guidance
8	a	simple (1)	[1]	More than 1 response = 0 marks
	b	<div style="text-align: right;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> </div> ...be more likely to transmit impulses...(1)	[1]	
	c	Mike (1) Hannah (1)	[2]	More than two responses – deduct 1 mark for each additional response.
<b>Total</b>			<b>[4]</b>	

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