

**Biology A**

**Twenty First Century Science Suite**

**General Certificate of Secondary Education J633**

**Mark Schemes for the Units**

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**January 2010**

**J633/MS/R/10J**

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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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### GCSE Twenty First Century Biology A (J633)

#### MARK SCHEMES FOR THE UNITS

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# Guidance for Examiners

Additional Guidance within any mark scheme takes precedence over the following guidance.

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. Annotations:  
The following annotations are available on SCORIS.

✓	= correct response
✗	= incorrect response
bod	= benefit of the doubt
nbod	= benefit of the doubt <b>not</b> given
ECF	= error carried forward
^	= information omitted
I	= ignore
R	= reject

6. If a candidate alters his/her response, examiners should accept the alteration.
7. 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.

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.

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

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

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

This would be worth one mark.

Put ticks (✓) in the two correct boxes.

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

This would be worth one mark.

8. 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.

9. 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

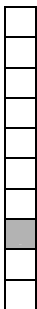
<b>Edinburgh</b>	<input type="checkbox"/>
<b>Manchester</b>	<input type="checkbox"/>
<b>Paris</b>	<input type="checkbox"/>
<b>Southampton</b>	<input type="checkbox"/>

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).

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

## A221/01 Modules B1, B2, B3 Foundation Tier

Question		Expected Answers	Marks	Additional Guidance
1	a	an immune (1) engulf (1) antibodies (1)	[3]	<b>accept</b> any clear indication of a correct response more than one word circled in any sentence scores 0 marks
	b	His body reacts more quickly ... <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/>	[1]	if more than 1 box is ticked, deduct 1 mark for each incorrect answer candidates cannot score less than 0 marks <b>accept</b> any clear indication of a correct response
		<b>Total</b>	<b>[4]</b>	

Question		Expected Answers	Marks	Additional Guidance
2	a	gene in same place as Steve's (1) 	[1]	<b>accept</b> third band from bottom only more than one box shaded scores 0 marks
	b	alleles (1) recessive (1)	[2]	<b>accept</b> crossing out of other words
	c	Mary has inherited a combination ... <input type="checkbox"/> (1) <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	[1]	if more than 1 box is ticked, deduct 1 mark for each incorrect answer candidates cannot score less than zero marks <b>accept</b> any clear indication of a correct response
<b>Total</b>			[4]	

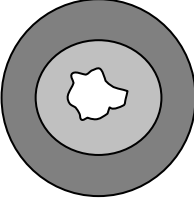
Question		Expected Answers	Marks	Additional Guidance
3		<p style="text-align: right;"><input type="checkbox"/></p> <p>... by several different genes. <input checked="" type="checkbox"/> (1)</p> <p>... environmental factors ... <input checked="" type="checkbox"/> (1)</p> <p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p>	[2]	<p>If more than 2 boxes are ticked deduct 1 mark for each incorrect answer</p> <p>candidates cannot score less than zero marks</p> <p><b>accept</b> any clear indication of a correct response</p>
		<b>Total</b>	[2]	



Question		Expected Answers	Marks	Additional Guidance
4	a	<p>... have the pregnancy terminated. <input type="checkbox"/></p> <p>... have any more children. <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	[2]	<p>if more than 2 boxes are ticked deduct 1 mark for each incorrect answer</p> <p>candidates cannot score less than zero marks</p> <p><b>accept</b> any clear indication of a correct response</p>
	b	<p><b>any two from:</b></p> <p>name of risk involved other than miscarriage;</p> <p>not worth having the test if you will have the baby anyway / help them decide whether to terminate the pregnancy;</p> <p>it is ethically wrong / it is unnatural (against God);</p> <p>how reliable the test is;</p> <p>affect insurance company / society using the result;</p> <p>family history;</p> <p>how severe the disorder is;</p> <p>stress to parent;</p>	[2]	
		<b>Total</b>	<b>[4]</b>	

Question		Expected Answers	Marks	Additional Guidance
5	a	<p>... are unspecialised cells. <input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>... develop into any other kind of cell. <input checked="" type="checkbox"/> (1)</p>	[2]	if more than 2 boxes are ticked deduct 1 mark for each incorrect answer candidates cannot score less than zero marks <b>accept</b> any clear indication of a correct response
	b	<p><b>more</b> people will be cured (1) than embryos destroyed/used / than the number of people who object (1)</p>	[2]	<b>allow</b> 'lots of people will be cured' / owtte
		<b>Total</b>	<b>[4]</b>	
6	a	safe (1)	[1]	
	b	i	Stella (1)	[1]
		ii	states a benefit (eg prevents disease spreading / provides immunity) <b>AND</b> states a risk (eg not safe / side effect) (1)	[1]
		<b>Total</b>	<b>[3]</b>	

Question		Expected Answers	Marks	Additional Guidance												
7	a	viruses (1)	[1]													
	b	<table style="width: 100%; border: none;"> <tr> <td></td> <td style="text-align: right;">true</td> <td style="text-align: right;">false</td> </tr> <tr> <td>... may become resistant ...</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>... not be used on mild infections.</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>When you feel better ...</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>		true	false	... may become resistant ...	<input checked="" type="checkbox"/>	<input type="checkbox"/>	... not be used on mild infections.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	When you feel better ...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	[2]	three correct rows = 2 marks two correct rows = 1 mark one correct row = 0 marks
	true	false														
... may become resistant ...	<input checked="" type="checkbox"/>	<input type="checkbox"/>														
... not be used on mild infections.	<input checked="" type="checkbox"/>	<input type="checkbox"/>														
When you feel better ...	<input type="checkbox"/>	<input checked="" type="checkbox"/>														
	c	tested on healthy people for safety (1) tested on ill people for effectiveness/safety (1) tested on volunteers (1)	[3]													
		<b>Total</b>	[6]													

Question		Expected Answers	Marks	Additional Guidance
8	a	content added to inside of blood vessel (1) artery wall of same thickness (1)	[2]	 <p><b>allow</b> 1 mark for a narrowed lumen with no indication of artery wall thickness.</p>
	b	<div style="text-align: center;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>                      exercise <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>                      low fat diet <input checked="" type="checkbox"/> (1)                 </div>	[2]	if more than 2 boxes are ticked deduct 1 mark for each incorrect answer candidates cannot score less than zero marks <b>accept</b> any clear indication of a correct response
<b>Total</b>			[4]	

Question		Expected Answers	Marks	Additional Guidance
9	a	million (1) millions (1) many (1)	[3]	<b>accept</b> any clear indication of a correct response more than one word indicated per sentence scores zero marks
	b	Petra says natural selection. <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/>	[1]	if more than 1 box is ticked, deduct 1 mark for each incorrect answer candidates cannot score less than 0. <b>accept</b> any clear indication of a correct response
		<b>Total</b>	<b>[4]</b>	
10	a	extinction (of a species/dinosaurs) (1)	[1]	<b>accept</b> 'died out' for extinction 'died' alone is insufficient
	b	<b>any two from:</b> humans were not alive then / people did not see it happen; lack of data; different ways of interpreting the data;	[2]	<b>accept</b> in any order <b>accept</b> 'not much evidence' <b>accept</b> 'there is no proof' <b>accept</b> no-one is certain <b>reject</b> there is no evidence
		<b>Total</b>	<b>[3]</b>	

Question		Expected Answers	Marks	Additional Guidance
11	a	<p>... short-lived electrical impulses. <input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>... nerve cells to link ... <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	[2]	<p>if more than 2 boxes are ticked deduct 1 mark for each incorrect answer</p> <p>candidates cannot score less than zero marks</p> <p><b>accept</b> any clear indication of a correct response</p>
	b	<p><b>any two from:</b></p> <p>transported in blood;</p> <p>chemicals / not electrical;</p> <p>long lasting;</p> <p>slow;</p>	[2]	<p><b>ignore</b> more widespread / permanent / released from glands / mood effects</p> <p><b>allow</b> released from <u>endocrine</u> glands</p> <p><b>allow</b> reverse argument providing answer clearly refers to nervous system</p> <p><b>reject</b> contradiction such as 'hormone impulses are slow'</p>
		<b>Total</b>	<b>[4]</b>	

## A221/02 Modules B1, B2, B3 Higher Tier

Question		Expected Answers	Marks	Additional Guidance
1	a	X (for Mary) Y (for Steve)	[1]	both needed for mark <b>accept</b> upper or lower case
	b	X (1)	[1]	<b>accept</b> any clear indication of correct response
	c	environmental factors (1)	[1]	<b>accept</b> an example eg physical injury / lifestyle
		<b>Total</b>	<b>[3]</b>	
2		<div style="text-align: right; margin-right: 20px;"> <input type="checkbox"/>  <input checked="" type="checkbox"/> (1)  <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/> </div> ... by several different genes. ... environmental factors ...	[2]	if more than two boxes ticked then deduct 1 mark for each incorrect response candidates cannot score less than zero marks <b>accept</b> any clear indication of correct response
			<b>Total</b>	<b>[2]</b>

Question		Expected Answers	Marks	Additional Guidance
3	a	<p>... have the pregnancy terminated. <input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>... have any more children. <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	[2]	<p>if more than two boxes ticked then deduct 1 mark for each incorrect response</p> <p>candidates cannot score less than zero marks</p> <p><b>accept</b> any clear indication of correct response</p>
	b	<p><b>any three from:</b></p> <p>name of risk involved other than miscarriage;</p> <p>not worth having the test if you will have the baby anyway / help them decide whether to terminate;</p> <p>it is ethically wrong / the test is unnatural (against God);</p> <p>how reliable the test is;</p> <p>affect insurance company / society using the result;</p> <p>family history;</p> <p>how severe the disorder is;</p> <p>stress to parent;</p>	[3]	
		<b>Total</b>	<b>[5]</b>	



Question		Expected Answers	Marks	Additional Guidance
4	a	<input type="checkbox"/> <input type="checkbox"/> A new nucleus...an empty egg cell <input checked="" type="checkbox"/> A nucleus...an adult body cell <input checked="" type="checkbox"/> A nucleus is removed from egg cell <input checked="" type="checkbox"/>	[2]	three correct = 2 marks two correct = 1 mark one correct = 0 marks  if more than three boxes ticked then deduct 1 mark for each incorrect response candidates cannot score less than zero marks <b>accept</b> any clear indication of correct response
	b	Embryos can be used ... <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... to treat some diseases. <input checked="" type="checkbox"/> (1)	[2]	if more than two boxes ticked then deduct 1 mark for each incorrect response candidates cannot score less than zero marks <b>accept</b> any clear indication of correct response
<b>Total</b>			[4]	

Question		Expected Answers	Marks	Additional Guidance																				
5	a	<table border="1"> <thead> <tr> <th></th> <th>chemical</th> <th>physical</th> <th>both</th> <th></th> </tr> </thead> <tbody> <tr> <td>skin with sweat glands</td> <td></td> <td></td> <td>✓</td> <td>(1)</td> </tr> <tr> <td>stomach acid</td> <td>✓</td> <td></td> <td></td> <td>(1)</td> </tr> <tr> <td>tears</td> <td>✓</td> <td></td> <td></td> <td>(1)</td> </tr> </tbody> </table>		chemical	physical	both		skin with sweat glands			✓	(1)	stomach acid	✓			(1)	tears	✓			(1)	[3]	if more than 1 box ticked per line, then line scores 0 marks <b>accept</b> any clear indication of correct response
			chemical	physical	both																			
		skin with sweat glands			✓	(1)																		
		stomach acid	✓			(1)																		
tears	✓			(1)																				
	b	<p>Antibodies are made ... <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>Once made, antibodies can be ... <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	[2]	if more than two boxes ticked then deduct 1 mark for each incorrect response candidates cannot score less than zero marks <b>accept</b> any clear indication of correct response																				
		<b>Total</b>	[5]																					

Question		Expected Answers	Marks	Additional Guidance
6	a	safe (1)	[1]	<b>accept</b> any clear indication of correct response.
	b	i Stella (1)	[1]	<b>accept</b> any clear indication of correct response.
		ii states a benefit (eg prevents disease spreading / provides immunity) <b>AND</b> states a risk (eg not safe / side effect)	[1]	<b>ignore</b> benefits outweigh the risks / it is risky <b>ignore</b> 'vaccination affects you' as not specific enough
<b>Total</b>			<b>[3]</b>	

7			<table border="1"> <thead> <tr> <th></th> <th>blind</th> <th>double-blind</th> <th>non-blind</th> </tr> </thead> <tbody> <tr> <td>... patient does not know ... doctor does.</td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td>Both the patient and the doctor know ...</td> <td></td> <td></td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Neither the patient nor the doctor know ...</td> <td></td> <td style="text-align: center;">✓</td> <td></td> </tr> </tbody> </table>				blind	double-blind	non-blind	... patient does not know ... doctor does.	✓			Both the patient and the doctor know ...			✓	Neither the patient nor the doctor know ...		✓		<p><b>[2]</b></p> <p>three correct ticks = 2 marks two correct ticks = 1 marks one correct tick = 0 marks</p> <p>deduct 1 mark for each <b>additional</b> incorrect tick candidates cannot score less than zero marks</p> <p><b>accept</b> other unambiguous indication of correct answer eg shading</p>
				blind	double-blind	non-blind																
			... patient does not know ... doctor does.	✓																		
			Both the patient and the doctor know ...			✓																
Neither the patient nor the doctor know ...		✓																				
<b>Total</b>			<b>[2]</b>																			

Question		Expected Answers	Marks	Additional Guidance
8	a	fewer finches / owtte (1) higher proportion of bigger beaks / average beak size increases / correct reference to fewer finches with beaks at the extremes (1)	[2]	idea of proportion needed for second mark idea of bigger beaks alone or fewer smaller beaks does not score
	b	natural selection / survival of the fittest (1)	[1]	<b>ignore</b> Darwin's theory or evolution
	c	few to start with (1) less chance of them surviving/breeding (1)	[2]	<b>accept</b> example of predator / disease <b>accept</b> could wipe out the small number of individuals <b>ignore</b> competition for food arguments
	<b>Total</b>		<b>[5]</b>	
9	a	A B	[1]	both required for mark <b>accept</b> either order
	b	<b>any two from:</b> loss of face/credibility / loss of reputation; pride / stubbornness / does not want work to be a waste of time; loss of funding;	[2]	<b>ignore</b> religious beliefs / she thinks she is right
	<b>Total</b>		<b>[3]</b>	

Question		Expected Answers	Marks	Additional Guidance
10	a	<p>... short-lived electrical impulses. <input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>... nerve cells to link ... <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	[2]	<p>if more than two boxes ticked then deduct 1 mark for each incorrect response</p> <p>candidates cannot score less than zero marks</p> <p><b>accept</b> any clear indication of correct response</p>
	b	<p><b>any three from:</b></p> <p>transported in blood;</p> <p>chemical / not electrical;</p> <p>long lasting / long lived;</p> <p>slow;</p>	[3]	<p><b>ignore</b> more widespread / permanent / released from glands / mood effects</p> <p><b>ignore</b> any reference to hormones instead of chemicals as this is given in the question</p> <p><b>ignore</b> reference to specific hormones such as insulin</p> <p><b>allow</b> released from <u>endocrine</u> glands</p> <p><b>allow</b> reverse argument providing answer clearly refers to nervous system</p> <p><b>allow</b> two answers on same line</p> <p><b>reject</b> contradiction such as 'hormone impulses are slow'</p> <p><b>reject</b> any ref to hormones making permanent changes</p> <p>only penalise incorrect use of the word 'impulse' once</p>
<b>Total</b>			<b>[5]</b>	

Question		Expected Answers			Marks	Additional Guidance																				
11	a	(leaf-eating) insects moths			[1]	both required for mark																				
	b	<table border="1"> <thead> <tr> <th></th> <th>increase</th> <th>decrease</th> <th>increase/ decrease</th> </tr> </thead> <tbody> <tr> <td>blue tit number decrease</td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>more predators of shrews</td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>more food for moths</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>more food for shrews</td> <td>✓</td> <td></td> <td></td> </tr> </tbody> </table>				increase	decrease	increase/ decrease	blue tit number decrease			✓	more predators of shrews		✓		more food for moths	✓			more food for shrews	✓			[2]	four correct rows = 2 marks two or three correct rows = 1 mark one correct row = 0 marks  if more than 1 tick in a row then row does not score
	increase	decrease	increase/ decrease																							
blue tit number decrease			✓																							
more predators of shrews		✓																								
more food for moths	✓																									
more food for shrews	✓																									
	c	... environmental conditions <input checked="" type="checkbox"/> ... a new competitor species <input checked="" type="checkbox"/> <input type="checkbox"/> ... species ... becoming extinct <input checked="" type="checkbox"/> ... a disease-causing organism <input checked="" type="checkbox"/> <input type="checkbox"/>			[2]	four correct ticks = 2 marks two or three correct ticks = 1 mark one correct tick = 0 marks																				
		<b>Total</b>			<b>[5]</b>																					

## A222/01 Modules B4, B5 and B6 Foundation Tier

Question		Expected Answers	Marks	Additional Guidance
1	a	homeostasis (1)	[1]	more than 1 response = 0 marks <b>accept</b> any other clear response eg cross, shaded, underlined
	b		[2]	three lines correct = 2 marks one or two lines correct = 1 mark
	c	receptors send information to the brain / owtte (1) brain does something with the information / owtte (1) (effectors) do something sensible based on information from receptors / owtte (1)	[3]	
		<b>Total</b>	<b>[6]</b>	

Question		Expected Answers	Marks	Additional Guidance												
2	a	partially permeable <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	[1]	more than 1 response = 0 marks <b>accept</b> any other clear response eg cross, shaded or ring around 'partially permeable' or box, underlined												
	b	<table border="1"> <thead> <tr> <th></th> <th>increases</th> <th>decreases</th> <th>stays the same</th> </tr> </thead> <tbody> <tr> <td>... pure water</td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td>... sucrose solution</td> <td></td> <td style="text-align: center;">✓</td> <td></td> </tr> </tbody> </table>		increases	decreases	stays the same	... pure water	✓			... sucrose solution		✓		[2]	one mark for each correct row deduct 1 mark for each additional tick in each row <b>accept</b> any other clear indication of correct response
	increases	decreases	stays the same													
... pure water	✓															
... sucrose solution		✓														
	c	the same as the blood plasma <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/>	[1]	more than 1 response = 0 marks <b>accept</b> any other clear response eg cross, shaded or ring around 'the same as blood plasma' or box, underlined												
		<b>Total</b>	[4]													



Question		Expected Answers	Marks	Additional Guidance																		
3	a	breathing producing faeces sweating	[1]	three responses correct = 1 mark one or two responses correct = 0 marks more than 3 responses = 0 marks <b>accept</b> any other clear response eg underlined, ticked, or crosses (if no other type of response shown)																		
	b	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>filtered out of the blood</th> <th>found in the urine</th> </tr> </thead> <tbody> <tr> <td>salt</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>sugar</td> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td>urea</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>water</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> <tr> <td></td> <td style="text-align: center;">(1)</td> <td style="text-align: center;">(1)</td> </tr> </tbody> </table>		filtered out of the blood	found in the urine	salt	✓	✓	sugar	✓		urea	✓	✓	water	✓	✓		(1)	(1)	[2]	mark as vertical columns one mark for each correct vertical column <b>accept</b> any other clear response e.g. shading or crosses
	filtered out of the blood	found in the urine																				
salt	✓	✓																				
sugar	✓																					
urea	✓	✓																				
water	✓	✓																				
	(1)	(1)																				
	c	<u>concentrated</u> water lost as sweat / save water / owtte (1)  <u>concentrated</u> idea of salt increasing water retention / owtte (1)	[2]	<b>accept</b> correct reference to osmosis																		
		<b>Total</b>	[5]																			
4	a	four (1) double (1)	[2]	<b>accept</b> any other clear indication of correct response such as linking words to spaces																		
	b	Helen Frank	[1]	both required for mark <b>accept</b> either way round <b>accept</b> any other clear indication of correct response such as linking names to spaces																		
	c	copied / replicated / double (1) separate / split / divide / go into different cells (1)	[2]																			
		<b>Total</b>	[5]																			

Question		Expected Answers	Marks	Additional Guidance						
5	a	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td><td> </td></tr> <tr><td>seed coat</td><td>✓</td></tr> <tr><td> </td><td> </td></tr> </table> (1)			seed coat	✓			[1]	more than 1 response = 0 marks <b>accept</b> any other clear response eg cross, shaded or ring around 'seed coat' or box, underlined
seed coat	✓									
b	hormones (1)	[1]	more than 1 response = 0 marks <b>accept</b> any other clear response eg underlined							
	c	i	B (1)	[1]	more than one response = 0 marks <b>accept</b> ring around B or diagram B					
		ii	photosynthesis (1)	[1]	more than 1 response = 0 marks <b>accept</b> any other clear response eg underlined					
<b>Total</b>			<b>[4]</b>							

6	a	30 (1)	[1]	more than 1 response = 0 marks <b>accept</b> any other clear response eg underlined				
	b	meiosis (1) all (1)	[2]	more than one response for each sentence = 0 marks for the sentence <b>accept</b> any other clear response eg lines linking words to spaces				
	c	<table 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>specialised <input checked="" type="checkbox"/> (1)</td></tr> </table>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	specialised <input checked="" type="checkbox"/> (1)	[1]	more than 1 response = 0 marks <b>accept</b> any other clear response eg cross, shaded or ring around specialised or box, underlined
<input type="checkbox"/>								
<input type="checkbox"/>								
<input type="checkbox"/>								
specialised <input checked="" type="checkbox"/> (1)								
	d	idea that genes code for milk production / owtte (1) idea of switched on or off (1)	[2]					
<b>Total</b>			<b>[6]</b>					

Question		Expected Answers	Marks	Additional Guidance
7	a	consciousness intelligence language development	[2]	three correct = 2 marks two correct = 1 mark more than three responses, deduct 1 mark for each additional response candidate cannot score less than zero marks
	b	<div style="text-align: right; margin-right: 20px;"><input type="checkbox"/></div> <div style="text-align: right; margin-right: 20px;"><input type="checkbox"/></div> storing information <input checked="" type="checkbox"/> <div style="text-align: right; margin-right: 20px;"><input checked="" type="checkbox"/></div> retrieving information	[1]	two correct responses = 1 mark deduct 1 mark for each additional incorrect response candidates cannot score less than zero <b>accept</b> any other clear response eg cross, shaded or ring around 'storing info' 'retrieving info' or box, underlined
	c	i		
		<div style="text-align: right; margin-right: 20px;"><input type="checkbox"/></div> <div style="text-align: right; margin-right: 20px;"><input type="checkbox"/></div> ... both short and long-term memory <input checked="" type="checkbox"/> (1)	[1]	more than 1 response = 0 marks <b>accept</b> any other clear response eg cross, shaded or ring around '... both short and long ...' or box, underlined
		ii		
		... are more likely to transmit ... <input checked="" type="checkbox"/> (1) <div style="text-align: right; margin-right: 20px;"><input type="checkbox"/></div> <div style="text-align: right; margin-right: 20px;"><input type="checkbox"/></div> <div style="text-align: right; margin-right: 20px;"><input type="checkbox"/></div>	[1]	more than 1 response = 0 marks <b>accept</b> any other clear response eg cross, shaded or ring around '... are more likely to transmit ...' or box, underlined
<b>Total</b>			[5]	

Question		Expected Answers	Marks	Additional Guidance
8	a	simple involuntary	[1]	any order both required for mark <b>accept</b> lines linking words to spaces
	b	<div style="text-align: right;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> (1) </div> ... hide from predators.	[1]	more than 1 response = 0 marks <b>accept</b> any other clear response eg cross, shaded or ring around '... hide from predators' or box, underlined
	c	brain spinal cord	[1]	two correct responses = 1 mark deduct 1 mark for each additional incorrect response candidates cannot score less than zero marks <b>accept</b> any other indication of correct response eg underlining
<b>Total</b>			[3]	
9	a	B (1)	[1]	more than one response = 0 marks <b>accept</b> a ring around the letter B or the word axon next to B
	b	(label) C / around the <u>axon</u> / <u>fibre</u> (1) <u>insulates</u> the neuron / axon / fibre (1) increases / speeds up the transmission/impulse/message (1)	[3]	<b>accept</b> 'fatty sheath' next to C  must refer to speed or rate of transmission <b>ignore</b> efficiency of impulse transmission <b>ignore</b> quick impulses (unqualified)
<b>Total</b>			[4]	

## A222/02 Modules B4, B5 and B6 Higher Tier

Question		Expected Answers	Marks	Additional Guidance																		
1	a	breathing producing faeces sweating	[1]	three responses correct = 1 mark one or two responses correct = 0 marks more than 3 responses = 0 marks <b>accept</b> any other clear response eg underlined, ticked, or crosses (if no other type of response shown)																		
	b	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>filtered out of the blood</th> <th>found in the urine</th> </tr> </thead> <tbody> <tr> <td>salt</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>sugar</td> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td>urea</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>water</td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> <tr> <td></td> <td style="text-align: center;">(1)</td> <td style="text-align: center;">(1)</td> </tr> </tbody> </table>		filtered out of the blood	found in the urine	salt	✓	✓	sugar	✓		urea	✓	✓	water	✓	✓		(1)	(1)	[2]	mark as vertical columns one mark for each correct vertical column <b>accept</b> any other clear response eg shading or crosses
	filtered out of the blood	found in the urine																				
salt	✓	✓																				
sugar	✓																					
urea	✓	✓																				
water	✓	✓																				
	(1)	(1)																				
	c	<u>concentrated</u> water lost as sweat / save water / owtte (1) <u>concentrated</u> idea of salt increasing water retention / owtte (1)	[2]	<b>accept</b> correct reference to osmosis																		
		<b>Total</b>	[5]																			

2	a	35 (°C) (1)	[1]	
	b	the heat balance is not maintained because the body heat cannot be replaced as fast as it is being lost / owtte (1)	[1]	response must indicate that body is trying, unsuccessfully, to replace heat lost <b>ignore</b> keeping heat inside body – must be an active process
	c	i	[1]	both required for mark <b>accept</b> any other clear response eg lines linking words to spaces
		ii	[1]	both required for mark <b>accept</b> underlined, correct responses
		<b>Total</b>	[4]	

Question			Expected Answers	Marks	Additional Guidance
3	a	i	Jimmy (1)	[1]	<b>accept</b> any other clear response e.g. lines linking words to spaces
		ii	Rachel (1)	[1]	<b>accept</b> any other clear response e.g. lines linking words to spaces
	b			[2]	one mark for each correct pair of crossed lines
	c		30 to 48 (°C) (1)	[1]	<b>accept</b> either way round
	d		pH of the solution (1)	[1]	<b>accept</b> any other clear response eg cross or underlined
			<b>Total</b>	[6]	

Question		Expected Answers	Marks	Additional Guidance
4	a	meiosis (1) all (1)	[2]	more than one response for each sentence = 0 marks for the sentence <b>accept</b> any other clear response eg lines linking words to spaces
	b	<div style="text-align: right;"> <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>            ... specialised. <input checked="" type="checkbox"/> (1)         </div>	[1]	more than 1 response = 0 marks <b>accept</b> any other clear response eg cross, shaded or ring around specialised or box, underlined
<b>Total</b>			<b>[3]</b>	
5	a	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px;">4</div> <div style="border: 1px solid black; padding: 2px 5px;">2</div> <div style="border: 1px solid black; padding: 2px 5px;">4</div> <div style="border: 1px solid black; padding: 2px 5px;">1</div> </div> (1)	[1]	all correct in the sequence = 1 mark
	b	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px;">3</div> <div style="border: 1px solid black; padding: 2px 5px;">2</div> <div style="border: 1px solid black; padding: 2px 5px;">4</div> <div style="border: 1px solid black; padding: 2px 5px;">2</div> </div> (1)	[1]	all correct in the sequence = 1 mark
	c	1 (1)	[1]	more than one response = 0 marks
	<b>Total</b>			<b>[3]</b>

Question			Expected Answers	Marks	Additional Guidance
6	a	i	<p>The shoot stops growing. <input type="checkbox"/> B</p> <p>The shoot grows to the right. <input type="checkbox"/> C</p> <p>The shoot grows to the left. <input type="checkbox"/> A</p>	[1]	<p>all correct responses = 1 mark</p> <p><b>accept</b> any other clear response eg lines linking letters to boxes</p>
		ii	<p>Laani (1)</p> <p>Chris (1)</p>	[2]	<p>more than two responses - deduct one mark for each additional response</p> <p><b>accept</b> correct responses in either order</p> <p><b>accept</b> any other clear response eg lines linking names to spaces, rings around correct names</p>
	b		<p>idea that plants grow towards light (1)</p> <p>(light needed) for photosynthesis / to make food (1)</p> <p>plants are competing better / gain an advantage (1)</p>	[3]	<p><b>ignore</b> bend/move towards light</p> <p><b>ignore</b> unqualified reference to increased survival</p>
			<b>Total</b>	<b>[6]</b>	



Question			Expected Answers	Marks	Additional Guidance
7	a		B (1)	[1]	more than one response = 0 marks <b>accept</b> a ring around the letter B or the word axon next to B
	b		(label) C / around the <u>axon</u> / <u>fibre</u> (1) <u>insulates</u> the neuron / axon / fibre (1) increases / speeds up the transmission/impulse/message (1)	[3]	<b>accept</b> 'fatty sheath' next to C  must refer to speed or rate of transmission <b>ignore</b> efficiency of impulse transmission <b>ignore</b> quick impulses (unqualified)
			<b>Total</b>	[4]	

8	a	i	retrieval (1) storage (1)	[2]	<b>accept</b> responses in either order <b>accept</b> correct, alternative words eg stored <b>reject</b> 'processing'
		ii	cerebral cortex (1)	[1]	<b>allow</b> cerebrum, cortex, cerebral hemispheres, frontal lobe <b>reject</b> cerebellum, front part
	b		correct reference to pattern (1) correct reference to repetition/repeating (1) correct reference to associated stimulus (1)	[3]	<b>accept</b> a named example eg mnemonic, use of songs <b>accept</b> a named example eg lots of times / over and over <b>accept</b> a named example eg linking to colours, sounds, taste
	c		Edward and Chris (1)	[1]	both required for mark <b>accept</b> in either order <b>accept</b> any other clear response eg lines linking names to spaces, rings around correct names
			<b>Total</b>	[7]	

Question		Expected Answers	Marks	Additional Guidance
9	a	slows down (1)	[1]	more than one response = 0 marks <b>accept</b> any other clear response eg underlined, ticked, or crosses (if no other type of response shown)
	b	(only) neuron <b>A</b> /one neuron can release the synapse chemical/serotonin (1) (only) neuron <b>B</b> /the <b>other</b> neuron/cell body has the receptor molecules to recognise the synapse chemical serotonin (1)	[2]	<b>accept</b> first neuron = A, second neuron = B only award 1 or 2 marks if response includes reference to chemical, serotonin or neurotransmitter
	c	increases (1)	[1]	<b>allow</b> anything that indicates bigger
		<b>Total</b>	[4]	

# Grade Thresholds

General Certificate of Secondary Education  
GCSE Twenty First Century Biology A (J633)  
January 2010 Examination Series

## Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
A221/01	Raw	42				25	20	16	12	8	0
	UMS	34				30	25	20	15	10	0
A221/02	Raw	42	32	29	24	19	12	8			0
	UMS	50	45	40	35	30	25	20			0
A222/01	Raw	42				21	17	13	9	5	0
	UMS	34				30	25	20	15	10	0
A222/02	Raw	42	32	26	19	13	10	8			0
	UMS	50	45	40	35	30	25	20			0

## Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A*	A	B	C	D	E	F	G	U
<b>J633</b>	300	270	240	210	180	150	120	90	60	0

The cumulative percentage of candidates awarded each grade was as follows:

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
<b>J633</b>	13.2	41.2	83.3	99.1	99.1	99.1	100.0	100.0	100.0	114

**275 candidates were entered for aggregation this series.**

For a description of how UMS marks are calculated see:

<http://www.ocr.org.uk/learners/ums/index.html>

Statistics are correct at the time of publication.

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