

Biology A
Twenty First Century Science

General Certificate of Secondary Education **J633**

Mark Schemes for the Units

January 2009

J633/MS/R/09J

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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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Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

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MARK SCHEMES FOR THE UNITS

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Guidance for Examiners

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. Each separate marking point is indicated by a (1) at the end of that marking point.
4. Abbreviations, annotations and conventions used in the detailed Mark Scheme:

ORA = or reverse argument

NOT = point that is not given credit

AW/owtte = alternative wording/or words to that effect: allow any expression that is clearly equivalent

/ = Alternative and acceptable answers for the same marking point

point = point must be present to gain the mark

(description) = description which need not be present to gain the mark

E.g. mark scheme shows 'work done in lifting / (change in) gravitational potential energy'

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. The list principle: if a list of responses greater than the number requested is given, you 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, i.e. 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.
7. Marking method for tick boxes:
If there is a set of boxes, some of which should be ticked and others left empty, then you need to judge the entire set of boxes.

E.g. 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). For a two-mark question, the rationale would be:

All boxes are indicated scores 0 marks.

All boxes blank scores 0 marks.

All four boxes correct scores 2 marks.

Three boxes correct scores 1 mark.

Two boxes correct scores 1 mark.

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

A221/01 Modules B1, B2, B3 Foundation Tier

Question		Expected Answers	Marks	Rationale
1	a	nucleus (1)	1	if more than one word is circled then circle scores zero allow any other clearly identified correct response e.g. shading in the box
	b	<div style="text-align: right; margin-right: 20px;"><input type="checkbox"/></div> carry instructions for a cell <input checked="" type="checkbox"/> (1) <div style="text-align: right; margin-right: 20px;"><input type="checkbox"/></div> code for making proteins <input checked="" type="checkbox"/> (1) <div style="text-align: right; margin-right: 20px;"><input type="checkbox"/></div>	2	if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
	c	<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> ... of very long DNA molecules. <input checked="" type="checkbox"/> (1) ... that make up chromosomes. <input checked="" type="checkbox"/> (1)	2	if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
Total			5	

Question		Expected Answers	Marks	Rationale
2	a	Peter (1)	1	one mark for the correct answer if more than one name is given then candidate scores zero.
	b	Ranjit (1)	1	one mark for the correct answer if more than one name is given then candidate scores zero.
	c	Jane (1)	1	one mark for the correct answer if more than one name is given then candidate scores zero.
	d	Stella (1)	1	one mark for the correct answer if more than one name is given then candidate scores zero.
Total			4	

Question		Expected Answers	Marks	Rationale
3	a		2	three lines correct = 2 marks two lines correct = 1 mark one line correct = 0 marks if there are two or more lines from a part of the body, then no mark is scored for that part

Question		Expected Answers	Marks	Rationale
3	b	<p style="text-align: right;"><input type="checkbox"/></p> <p>Body temperature is 37°C <input checked="" type="checkbox"/> (1)</p> <p style="text-align: right;"><input type="checkbox"/></p> <p>The body contains food ... <input checked="" type="checkbox"/> (1)</p> <p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p>	2	if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
	c	<p>microorganisms damage cells <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> <p>microorganisms produce toxins <input checked="" type="checkbox"/> (1)</p> <p style="text-align: right;"><input type="checkbox"/></p>	2	if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
		Total	6	

Question		Expected Answers	Marks	Rationale	
4	a	<p>The diagram shows four boxes on the left representing symptoms, connected by lines to boxes on the right representing the disorders and their genetic inheritance patterns:</p> <ul style="list-style-type: none"> Box 1 (top): difficulty breathing and digesting food. Connected to Huntington's disorder (one dominant allele of single gene). Box 2: high temperature and sweating. Connected to Huntington's disorder. Box 3: bleeding gums and wounds that don't heal. Connected to cystic fibrosis (three recessive alleles of a single gene). Box 4 (bottom): falling over, clumsiness and loss of memory. Connected to an unnamed disorder (four dominant alleles of a single gene). 	4	one mark for each correct line if more than four lines are drawn then each additional line loses one mark the candidate cannot score less than zero	
	b	i	D (1)	1	one mark for the correct answer. if more than one letter is given then candidate scores zero accept Cc
		ii	E (1) and B (1)	2	one mark for each correct answer if more than two letters are given then candidate loses one mark for each additional answer the candidate cannot score less than zero the two correct responses can be either way round accept hh and CC
Total			7		

Question		Expected Answers	Marks	Rationale
5	a	a safe form of the disease ... <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1	if more than one box is ticked then box scores zero allow any other clearly identified correct response e.g. shading in the box
	b	A (1)	1	if more than one answer given then = 0 marks
Total			2	

Question			Expected Answers	Marks	Rationale
6	a	i	Wendy (1)	1	
		ii	Stella (1)	1	
	b		<p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;">ice cream sales increase in hot ... <input checked="" type="checkbox"/> (1)</p> <p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p>	1	if more than one box is ticked then box scores zero
	c		<p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;">John caught a cold when ... <input checked="" type="checkbox"/> (1)</p> <p style="text-align: right;"><input type="checkbox"/></p>	1	if more than one box is ticked then box scores zero
	d		<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> <p style="text-align: right;">playing too much football <input checked="" type="checkbox"/> (1)</p>	1	if more than one box is ticked then box scores zero
Total				5	

Question			Expected Answers	Marks	Rationale
7	a	i	B (1)	1	if more than one letter is given then score = 0 marks accept correct written answer
		ii	A (1)	1	if more than one letter is given then score = 0 marks accept correct written answer
	b			3	five lines correct = 3 marks four or three lines correct = 2 marks two lines correct = 1 mark one line correct = 0 marks deduct one mark for each 'change' box with two lines
	c		... Earth had been slightly different ... <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1	if more than one box is ticked then box scores zero allow any other clearly identified correct response e.g. shading in the box
Total				6	

Question		Expected Answers	Marks	Rationale				
8	a	<table border="1"> <tr> <td>hormonal communication</td> <td>nervous communication</td> </tr> <tr> <td>B C</td> <td>A D</td> </tr> </table>	hormonal communication	nervous communication	B C	A D	2	4 correct = 2 marks 3 or 2 correct = 1 mark 1 correct = 0 marks
	hormonal communication	nervous communication						
B C	A D							
	b	<table> <tr> <td>chemical</td> <td>slow (1)</td> </tr> <tr> <td>electrical</td> <td>fast (1)</td> </tr> </table>	chemical	slow (1)	electrical	fast (1)	2	one mark for each correct sentence .
chemical	slow (1)							
electrical	fast (1)							
Total			4					

Question		Expected Answers	Marks	Rationale
9	a	environment <input checked="" type="checkbox"/> (1) other species <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/>	2	if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
	b	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> destroying the rain forest <input checked="" type="checkbox"/>	1	if more than one box is ticked then box scores zero allow any other clearly identified correct response e.g. shading in the box
Total			3	
Paper Total			42	

A221/02 Modules B1, B2, B3 Higher Tier

Question		Expected Answers	Marks	Rationale					
1	a	<table border="1"> <thead> <tr> <th>human male</th> <th>human female</th> </tr> </thead> <tbody> <tr> <td>XY</td> <td>XX</td> </tr> </tbody> </table>	human male	human female	XY	XX	2	(1) for each correct box allow lower case xy and xx yx and xx x and x y x	
		human male	human female						
XY	XX								
	b	Y (1)	1	allow the chromosome given above that is in the male box not the female box SRY (Sex determining Region on the Y chromosome) = 1 Reject 23 rd = 0 male = 0					
	c	It causes the testes to develop (1) <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>		✓				1	if more than one box ticked (0) allow any other clearly defined correct response
✓									
Total			4						

Question		Expected Answers	Marks	Rationale	
2	a	<pre> graph LR subgraph Symptoms S1[Difficulty breathing and digesting food] S2[High temperature and sweating] S3[Bleeding gums and wounds that don't heal] S4[Falling over, clumsiness and loss of memory] end subgraph Disorders HD[Huntingdon's disorder] CF[Cystic Fibrosis] end subgraph GeneticAnswers GA1[One dominant allele of single gene] GA2[Two recessive alleles of single gene] GA3[Three recessive alleles of a single gene] GA4[Four dominant alleles of a single gene] end S1 --- HD S2 --- HD S3 --- CF S4 --- CF HD --- GA1 HD --- GA2 CF --- GA3 CF --- GA4 </pre>	2	four lines correct (2) two or three lines correct (1) one line correct (0) additional lines lose (1) each candidate cannot score less than 0	
	b	i	D (1)	1	if more than one letter is given the candidate scores 0 allow Cc
		ii	E (1) B (1)	2	either way round allow hh and CC if more than two letter are given then the candidate loses (1) for each additional answer the candidate cannot score less than 0
Total			5		

Question		Expected Answers	Marks	Rationale
3	a	Peter (1)	1	if more than one name is given then the candidate scores (0)
	b	Ranjit (1)	1	if more than one name is given then the candidate scores (0)
	c	Jane (1)	1	if more than one name is given then the candidate scores (0)
	d	Stella (1)	1	if more than one name is given then the candidate scores (0)
Total			4	

Question		Expected Answers	Marks	Rationale
4	a	<p>the virus damages the immune system (1)</p> <p style="text-align: center;"><input checked="" type="checkbox"/></p> <p style="text-align: center;"><input type="checkbox"/></p> <p style="text-align: center;"><input type="checkbox"/></p> <p style="text-align: center;"><input type="checkbox"/></p> <p>the virus has a high mutation rate (1)</p> <p style="text-align: center;"><input checked="" type="checkbox"/></p>	2	<p>if more than two boxes ticked then each incorrect box loses (1)</p> <p>the candidate cannot score less than 0</p>
	b	<p>the vaccine was very effective</p> <p style="text-align: center;"><input type="checkbox"/></p> <p style="text-align: center;"><input checked="" type="checkbox"/></p> <p>a large percentage of the world's population was vaccinated against the disease</p> <p style="text-align: center;"><input checked="" type="checkbox"/></p> <p style="text-align: center;"><input type="checkbox"/></p>	1	<p>allow any other clearly defined response</p> <p>if more than two boxes are ticked (0)</p> <p>Both must be correct for 1 mark</p>
	c	<p>all school age children should receive the vaccine (1)</p> <p style="text-align: center;"><input type="checkbox"/></p> <p style="text-align: center;">V</p> <p style="text-align: center;"><input type="checkbox"/></p> <p>it has only been possible to vaccinate 81% of children (1)</p> <p style="text-align: center;">T</p>	2	<p>if more than one box is completed for each letter then box scores zero for that letter only.</p> <p>The candidate cannot score less than zero.</p>
Total			5	

Question		Expected Answers	Marks	Rationale
5	a	<p>placebos are harmless chemicals that have no effect on the body (1) the patient does not know if they are taking a placebo (1)</p> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 40px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px; margin-right: 5px; text-align: center;">✓</div> <div style="border: 1px solid black; width: 40px; height: 40px; margin-right: 5px; text-align: center;">✓</div> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> </div>	2	<p>if more than two boxes ticked then each incorrect box loses (1) the candidate cannot score less than 0</p>
	b	<p>it is morally wrong to give placebos when other more effective treatment are available (1)</p> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 40px; margin-right: 5px; text-align: center;">✓</div> <div style="border: 1px solid black; width: 40px; height: 40px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> </div>	1	<p>if more than one box is ticked then each incorrect box loses (1) the candidate cannot score less than (0)</p>

Question		Expected Answers	Marks	Rationale
5	c	<p>only an independent drug testing...(1)</p> <p>neither Ray or his doctor will know...(1)</p> <div style="display: flex; flex-direction: column; align-items: center;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div>	2	<p>if more than two boxes ticked then each incorrect box loses (1)</p> <p>the candidate cannot score less than 0</p>
	d	<p>to obtain reliable data (1)</p> <div style="display: flex; flex-direction: column; align-items: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> </div>	1	<p>if more than one box is ticked then each incorrect box loses (1)</p> <p>the candidate cannot score less than (0)</p>
Total			6	

Question			Expected Answers	Marks	Rationale
6	a	i	Wendy (1)	1	
		ii	Stella (1)	1	
	b		Ice cream sales increase in hot weather (1)	1	if more than one box is ticked then box scores 0
	c		John caught a cold when visiting Mary in hospital (1)	1	if more than one box is ticked then box scores 0
Total				4	

Question		Expected Answers	Marks	Rationale
7	a	<p>the number of sightings are increasing (1)</p> <p>the harlequin ladybirds are spreading across the country (1)</p>	2	<p>if more than two boxes are ticked then each incorrect box loses (1) candidate cannot score less than 0</p> <p>IGNORE answers in first / top box</p>
	b	<p>the mutation of a non-poisonous gene to a poisonous one (1)</p> <p>inheriting the gene from its parents (1)</p> <p>natural selection of the poisonous gene (1)</p>	3	<p>if more than three boxes are ticked then each incorrect box loses (1) the candidate cannot score less than 0</p>

Question		Expected Answers	Marks	Rationale
7	c	<p>There is not enough data currently available (1)</p> <p>scientists do not know how other species will adapt (1)</p> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <input checked="" type="checkbox"/> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <input type="checkbox"/> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <input checked="" type="checkbox"/> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <input type="checkbox"/> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <input type="checkbox"/> </div>		

Question			Expected Answers	Marks	Rationale				
8	a	i	B (1)	1	if more than one response (0) Accept correct written answer				
		ii	A (1)	1	if more than one response (0) Accept correct written answer				
	b		if conditions on Earth had been different from what they actually were (1) <table border="1" style="display: inline-table; vertical-align: middle; margin-left: 20px;"> <tr><td style="text-align: center;">✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>	✓				1	if more than one box is ticked then box scores 0
✓									
Total				3					

Question		Expected Answers	Marks	Rationale						
9	a	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">C</td> <td style="text-align: center;">B</td> <td style="text-align: center;">E</td> <td style="text-align: center;">A</td> <td style="text-align: center;">D</td> </tr> </table>	C	B	E	A	D	2	C before B; B before E; E before A 3 correct = 2 marks 2 correct = 1 mark 1 correct = 0 marks	
C	B	E	A	D						
	b	<p>the nervous system is faster than the hormone system (1)</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> <tr><td style="text-align: center;"> </td></tr> </table> <p>the nervous system uses electrical impulses (1)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td style="text-align: center;">✓</td></tr> </table>	✓					✓	2	if more than two boxes are ticked then each incorrect box loses (1) candidate cannot score less than 0
✓										
✓										
Total			4							
Paper Total			42							

A222/01 Modules B4, B5, B6 Foundation Tier

Question		Expected Answers	Marks	Rationale			
1	a	D C B A	2	C before B (1) B before A (1)			
	b	evaporates and cools the skin <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="text-align: center;">✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table>	✓			1	more than one response (0) Accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.
✓							
	c	increases (1) water (1)	2				
Total			5				

Question		Expected Answers	Marks	Rationale						
2	a	passive high low	2	3 correct (2) 2 correct (1) 1 or 0 correct (0)						
	b	...water molecules <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td style="text-align: center;">✓</td></tr><tr><td> </td></tr><tr><td style="text-align: center;">✓</td></tr><tr><td> </td></tr><tr><td style="text-align: center;">✓</td></tr></table> ...molecules across a partially permeable membrane ...molecules from a dilute to a concentrated solution		✓		✓		✓	2	3 correct = 2 marks 2 correct = 1 mark 1 correct = 0 marks Candidates lose 1 mark for each additional response. Candidates cannot score less than zero Accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.
✓										
✓										
✓										
	c	becomes higher (1)	1	more than one response (0)						
Total			5							

Question		Expected Answers	Marks	Rationale
3	a	drinking feeding respiring	2	more than three responses deduct (1) for each extra response 3 correct (2) 2 correct (1) 1 or 0 correct (0) Accept any other clear indication of correct response e.g. ticks, underlining etc.
	b	amount of salt eaten (1) <input type="checkbox"/> drinking alcohol (1) <input checked="" type="checkbox"/> external temperature (1) <input checked="" type="checkbox"/>	3	more than three responses deduct (1) for each extra response Accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.
Total			5	

Question			Expected Answers	Marks	Rationale				
4	a	i	mitosis (1)	1	more than one response (0)				
		ii	increases (1)	1	more than one response (0)				
	b	i	<p>...halved.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td> </td></tr> <tr><td style="text-align: center;">✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>		✓			1	<p>more than one response (0)</p> <p>Accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.</p>
✓									
		ii	zygote (1)	1	more than one response (0)				
		iii	28 (1)	1	more than one response (0)				
Total				5					

Question			Expected Answers	Marks	Rationale			
5	a	i	cytoplasm (1)	1	<p>more than one response (0)</p> <p>Accept any other clear indication of correct response e.g. ticks, underlining etc.</p>			
		ii	<p>...stops (1)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td> </td></tr> <tr><td> </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 e.g. crosses, shading, linking lines etc.</p>
✓								
	b		<p>four (1)</p> <p>bases (1)</p>	2	<p>(1) each</p> <p>Accept any other clear indication of correct response e.g. ticks, underlining etc.</p> <p>more than one response for each set of boxes (0)</p>			
Total				4				

Question		Expected Answers	Marks	Rationale
6	a	The cells are already specialised (1) <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1	more than one response (0) Accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.
	b	...some active and some inactive genes (1) <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	1	more than one response (0) Accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.
	c	zygote (1)	1	more than one response (0)
	d	...have some cells which continue to divide by mitosis (1) <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	1	more than one response (0) Accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.
Total			4	

Question			Expected Answers	Marks	Rationale
7	a	i	peripheral nervous system (1)	1	more than one response (0)
		ii	muscle cells (1)	1	more than one response (0)
	b	i	<p>...receptors to the CNS (1)</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; margin-right: 5px; text-align: center;">✓</div> </div>	1	<p>more than one response (0)</p> <p>Accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.</p>
		ii	C B D	2	<p>3 correct (2)</p> <p>2 correct (1)</p> <p>1 or 0 correct (0)</p>
Total				5	

Question		Expected Answers	Marks	Rationale	
8	a		1	<p>look at the link as it leaves the bottom left-hand box and connects to the top right hand box</p> <p>more than one response (0)</p>	
	b	i	<p>new pathways form (1)</p>	1	<p>more than one response (0)</p> <p>Accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.</p>
		ii	<p>impulses (1)</p>	1	<p>more than one response (0)</p> <p>Accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.</p>
	c	<p>Bob (1)</p> <p>Pnashe (1)</p>	2	allow the two correct names in either order	
Total			5		

Question		Expected Answers	Marks	Rationale					
9	a	<p>...remember things (1)</p> <p>...speak (1)</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td>✓</td></tr> </table>				✓	✓	2	<p>more than 2 responses, deduct (1) for each extra response</p> <p>Accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.</p>
✓									
✓									
	b	<p>...apply an electrical charge to parts of the brain (1)</p> <p>...look at images from an MRI scanner (1)</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>✓</td></tr> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>	✓		✓			2	<p>more than 2 responses, deduct (1) for each extra response</p> <p>Accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.</p>
✓									
✓									
		Total	4						
		Paper Total	42						

A222/02 Modules B4, B5, B6 Higher Tier

Question		Expected Answers	Marks	Rationale
1	a	drinking feeding respiring	2	more than three responses, deduct (1) for each extra response accept any other clear indication of correct response e.g. ticks, underlining etc. 3 correct (2) 2 correct (1) 1 or 0 correct (0)
	b	amount of salt eaten (1) <input type="checkbox"/> drinking alcohol (1) <input checked="" type="checkbox"/> external temperature (1) <input checked="" type="checkbox"/>	3	more than three responses deduct (1) for each extra response accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.
	c		2	correct line on left (1) correct line on right (1) more than one line on left or right side, 0 marks for that side ignore crossed-out lines
	d	Paul (1) Megan (1)	2	allow names in either order
Total			9	

Question			Expected Answers	Marks	Rationale							
2	a	i	hypothalamus (1)	1	more than one response (0) accept any other clear indication of correct response e.g. tick, underlining etc.							
		ii	<p>...temperature receptors are stimulated.</p> <p>...the skin becomes red.</p> <p>...the sweat glands produce more sweat.</p>	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td> </td></tr> <tr><td> </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> <tr><td> </td></tr> </table>			✓	✓	✓		2	<p>more than three responses deduct (1) for each extra response</p> <p>3 correct (2) 2 correct (1) 1 or 0 correct (0)</p> <p>accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.</p>
✓												
✓												
✓												
	b	i	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">B</td> <td style="text-align: center;">D</td> <td style="text-align: center;">A</td> <td style="text-align: center;">C</td> <td style="text-align: center;">E</td> </tr> </table>	B	D	A	C	E	2	<p>B before D D before A A before C</p> <p>3 correct (2) 2 correct (1) 1 or 0 correct (0)</p>		
B	D	A	C	E								

Question			Expected Answers	Marks	Rationale
2	b	ii	confusion <input checked="" type="checkbox"/> dizziness <input checked="" type="checkbox"/> hot, dry skin <input checked="" type="checkbox"/>	1	3 correct (1) accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.
Total				6	

Question			Expected Answers	Marks	Rationale
3	a	i	cytoplasm (1)	1	more than one response (0) accept any other clear indication of correct response e.g. tick, underlining etc.
		ii	...stops (1) <input checked="" type="checkbox"/>	1	more than one response (0) accept any other clear indication of correct response e.g. cross, shading, linking line etc.
	b		four (1) bases (1)	2	(1) each more than one response for each set of boxes (0) accept any other clear indication of correct response e.g. ticks, underlining etc.
Total				4	

Question			Expected Answers	Marks	Rationale
4	a	i	B C A	1	3 correct (1) more than one response in any box (0)
		ii	Kev (1) Jimmy (1)	2	allow names in either order
	b		photosynthesis (1)	1	more than one response (0) accept any other clear indication of correct response e.g. tick, underlining etc.
Total				4	

Question			Expected Answers	Marks	Rationale
5	a		zygote cell (1)	1	more than one response (0) accept any other clear indication of correct response e.g. tick, underlining etc.
		i	some inactivated genes are reactivated (1)	1	more than one response (0) accept any other clear indication of correct response e.g. cross, shading, linking line etc.
		ii	hormones (1)	1	more than one response (0) accept any other clear indication of correct response e.g. tick, underlining etc.
Total				3	

Question		Expected Answers	Marks	Rationale
6	a	<p>...remember things (1)</p> <p>...speak (1)</p> <div style="display: flex; flex-direction: column; align-items: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> </div>	2	<p>more than 2 responses, deduct (1) for each extra response</p> <p>accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.</p>
	b	<p>...apply an electrical charge to parts of the brain (1)</p> <p>...look at images from an MRI scanner (1)</p> <div style="display: flex; flex-direction: column; align-items: center;"> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div>	2	<p>more than 2 responses, deduct (1) for each extra response</p> <p>accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.</p>
Total			4	

Question			Expected Answers	Marks	Rationale					
7	a	i	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">E</td> <td style="text-align: center;">C</td> <td style="text-align: center;">A</td> <td style="text-align: center;">D</td> <td style="text-align: center;">B</td> </tr> </table>	E	C	A	D	B	3	C before A (1) A before D (1) D before B (1)
E	C	A	D	B						
		ii	...the motor neuron (1) <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td style="height: 20px;"></td></tr> <tr><td style="text-align: center;">✓</td></tr> <tr><td style="height: 20px;"></td></tr> <tr><td style="height: 20px;"></td></tr> </table>		✓			1	more than one response (0) accept any other clear indication of correct response e.g. cross, shading, linking line etc.	
✓										
	b		brain (1) increase (1)	2	accept any other clear indication of correct response e.g. linking lines etc.					
Total				6						

Question		Expected Answers	Marks	Rationale					
8	a	ears (1) cerebral cortex (1)	2	more than two responses deduct (1) for each additional response accept any other clear indication of correct response e.g. ticks, underlining etc.					
	b	<p>...by repeating the instructions</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> </table> <p>...by the pattern of left and right-hand turns</p>		✓		✓		1	2 correct (1) accept any other clear indication of correct response e.g. crosses, shading, linking lines etc.
✓									
✓									
	c	<p>...she knows that she turns left when she smells the sweet factory (1)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>		✓			1	more than one response (0) accept any other clear indication of correct response e.g. cross, shading, linking line etc.	
✓									
	d	B A C	2	3 correct (2) 2 correct (1) 1 or 0 correct (0)					
Total			6						

			Paper Total	42	
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Grade Thresholds

General Certificate of Secondary Education
Biology A (Specification Code J633)
January 2009 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
A221/01	Raw	42	N/A	N/A	N/A	29	24	19	14	9	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A221/02	Raw	42	39	36	30	24	15	10	N/A	N/A	0
	UMS	50	45	40	35	30	25	20	N/A	N/A	0
A222/01	Raw	42	N/A	N/A	N/A	29	25	21	17	13	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A222/02	Raw	42	38	34	28	23	18	15	N/A	N/A	0
	UMS	50	45	40	35	30	25	20	N/A	N/A	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
J633	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
J633	9.6	34.6	75.0	96.2	100.0	100.0	100.0	100.0	100.0	52

198 candidates were entered for aggregation this series.

For a description of how UMS marks are calculated see:

http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

14 – 19 Qualifications (General)

Telephone: 01223 553998

Facsimile: 01223 552627

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