

Biology A
Twenty First Century Science

General Certificate of Secondary Education **J633**

Mark Schemes for the Units

January 2008

J633/MS/R/08

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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.

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GCSE Twenty First Century Science - Biology A (J633)

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 (1) at the end of that marking point.
- 4 Abbreviations, annotations and conventions used in the detailed Mark Scheme:
 - / = alternative and acceptable answers for the same marking point
 - (1)** = separates marking points
 - not** = answers which are not worthy of credit
 - reject** = answers which are not worthy of credit
 - ignore** = statements which are irrelevant
 - allow** = answers that can be accepted
 - () = words which are not essential to gain credit
 - = underlined words must be present in answer to score a mark
 - ecf = error carried forward
 - AW / owtte = alternative wording
 - ora = or reverse argument

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 Annotations: the following annotations are available on SCORIS.

- ✓ = correct response
- ✗ = incorrect response
- bod = benefit of the doubt
- nbod = benefit of the doubt **not** 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 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.

8 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	i	can make poisons <input type="checkbox"/> (1) cells can be damaged <input checked="" type="checkbox"/> (1) <input type="checkbox"/>	2	If more than 2 boxes ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct boxes e.g. shading etc.
		ii	B anywhere before D (1) D anywhere before C (1) C anywhere before A (1)	3	
	b		has antibodies for chicken pox <input type="checkbox"/> (1) <input checked="" type="checkbox"/> <input type="checkbox"/>	1	If more than 1 box ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct box e.g. shading etc.
Total				6	
2	a		Jane (1)	1	If more than one answer given then score = zero
	b		Grace (1)	1	If more than one answer given then score = zero
	c		Shazia (1) Hannah (1)	2	Either order. If more than two answers given then -1 for each additional answer. Candidate cannot score less than 0.
Total				4	
3	a		viruses (1)	1	If more than one answer given then score = zero
	b		resistant to antibiotics <input type="checkbox"/> (1) <input checked="" type="checkbox"/>	1	If more than 1 box ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct box e.g. shading etc.
	c		C anywhere before A (1) A anywhere before D (1)	2	
Total				4	

Question			Expected Answers	Marks	Rationale									
4	a	i	same genes <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1)	✓			2	If more than 2 boxes ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct boxes e.g. shading etc.						
		✓												
same fertilized egg <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr></table> (1)	✓													
✓														
		ii	scars (1) hair style (1)	2	If more than two answers given then -1 for each additional answer. Candidate cannot score less than 0.									
	b		parents have different genes <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)	✓		2	If more than 2 boxes ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct boxes e.g. shading etc.							
✓														
	inherited different forms of genes <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)	✓												
✓														
	c	i	father's alleles correct (1) correct combinations in offspring (1)	2	Accept Bb or bB for second box <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td> </td><td> </td><td> </td></tr><tr><td>B</td><td> </td><td> </td></tr><tr><td> </td><td>Bb</td><td>bb</td></tr></table>				B				Bb	bb
B														
	Bb	bb												
	ii	ring around bb combination (1)	1	Allow <u>bb</u> indicated wherever it appears										
	d	i	XX (1)	1										
		ii	arguments for 1 st and 4 th arguments against 2 nd , 3 rd and 5 th	3	5 correct (3) 4 correct (2) 3 correct (1) less than 3 correct scores 0									
Total				13										

Question		Expected Answers	Marks	Rationale
5	a	how long ago the animal lived <input type="checkbox"/> (1)	2	If more than 2 boxes ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct boxes e.g. shading etc.
		the size of the animal <input checked="" type="checkbox"/> (1)		
	b	4 (1)	1	If more than one answer given then score = zero
	c	11 million year old rock <input checked="" type="checkbox"/> (1)	1	If more than 1 box ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct box e.g. shading etc.
	d	prey becomes extinct <input checked="" type="checkbox"/> (1)	3	If more than 3 boxes ticked then -1 for each additional answer.
		climate becomes too cold <input checked="" type="checkbox"/> (1)		
		new predator <input checked="" type="checkbox"/> (1)		
Total			7	
6	a	i any two from: A, D, E and F	2	
		ii B (1) C (1)	2	If more than two answers given then -1 for each additional answer. Candidate cannot score less than 0.
	b	sensory (1) stimulus (1) effector (1) response (1)	4	Must be in the correct order
Total			8	
Section total			42	

A221/02 Modules B1, B2, B3 Higher Tier

Question			Expected Answers	Marks	Rationale
1	a	i	Grace (1)	1	If more than one answer given then score = zero
		ii	Shazia (1) Hannah (1)	2	Accept either way round. If more than two answers given then -1 for each additional answer. Candidate cannot score less than 0.
	b		different studies not enough evidence	2	If more than 2 boxes ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct boxes e.g. shading etc.
	c	i	vaccine uptake increases, cases fall negative correlation	2	If more than 2 boxes ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct boxes e.g. shading etc.
		ii	fewer children were vaccinated (1)	1	If more than 1 box ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct box e.g. shading etc.
	d		statement A (1) statement B (1)	2	Accept either way round. If more than two answers given then -1 for each additional answer. Candidate cannot score less than 0.
Total				10	

2	a		microorganisms can become resistant to antibiotics (1)	1	If more than 1 box ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct box e.g. shading etc
	b		E before A A before D D before B B before C	3	4 correct (3) 3 correct (2) 2 correct (1)
Total				4	

Question		Expected Answers	Marks	Rationale									
3	a	<p>environmental factors</p> <p>transferring a nucleus</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td><input type="checkbox"/></td></tr> <tr><td><input type="checkbox"/></td></tr> <tr><td><input checked="" type="checkbox"/></td></tr> <tr><td><input checked="" type="checkbox"/></td></tr> </table> <p>(1)</p> <p>(1)</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2	<p>If more than 2 boxes ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct boxes e.g. shading etc.</p>					
<input type="checkbox"/>													
<input type="checkbox"/>													
<input checked="" type="checkbox"/>													
<input checked="" type="checkbox"/>													
	b	i	<p>father's alleles correct (1)</p> <p>correct combinations in offspring (1)</p>	<p>2</p> <p>Accept Bb or bB for second box</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td></td><td></td><td></td></tr> <tr><td>B</td><td></td><td></td></tr> <tr><td></td><td>Bb</td><td>bb</td></tr> </table>				B				Bb	bb
B													
	Bb	bb											
		ii	<p>ring around bb combination (1)</p>	<p>1</p> <p>Allow (bb) wherever it appears</p>									
	c	i	<p>Y (chromosome) (1)</p>	<p>1</p> <p>Reject any additional letters.</p>									
		ii	<p>arguments for 1st and 4th</p> <p>arguments against 2nd, 3rd and 5th</p>	<p>3</p> <p>5 correct (3)</p> <p>4 correct (2)</p> <p>3 correct (1)</p>									
Total			9										

4	a	<p>may give false positive</p> <p>employer may not promote him</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td><input checked="" type="checkbox"/></td></tr> <tr><td><input type="checkbox"/></td></tr> <tr><td><input checked="" type="checkbox"/></td></tr> <tr><td><input type="checkbox"/></td></tr> </table> <p>(1)</p> <p>(1)</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	<p>If more than 2 boxes ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct boxes e.g. shading etc.</p>
<input checked="" type="checkbox"/>								
<input type="checkbox"/>								
<input checked="" type="checkbox"/>								
<input type="checkbox"/>								
	b	<p>statement A (1)</p> <p>statement C (1)</p> <p>statement E (1)</p>	3	<p>If more than 3 circled then -1 for each additional answer. All circled (0) Candidate cannot score less than 0.</p>				
Total			5					

Question		Expected Answers	Marks	Rationale												
5	a	sentences 1, 2 and 4	2	Accept in any order. 3 correct (2) 2 correct (1) 1 correct (0) If more than 3 answers then -1 for each additional answer. Candidate cannot score less than 0.												
	b	11 million year old rock <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)		✓		1	If more than 2 boxes ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct boxes e.g. shading etc.									
✓																
	c	statement A (1) statement C (1) statement E (1)	3	Accept in any order. If more than three answers given then -1 for each additional answer. Candidate cannot score less than 0.												
	d	competition for prey <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><tr><td> </td></tr></table> (1) environmental conditions <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1) susceptible to disease <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)		✓		✓				✓			✓		3	If more than 3 boxes ticked then -1 for each additional answer. Candidate cannot score less than 0. Accept any suitable method of indicating correct boxes e.g. shading etc.
✓																
✓																
✓																
✓																
Total			9													

Question			Expected Answers	Marks	Rationale
6	a	i	any two from: A, D, E and F	2	Accept in any order. If additional answers given ignore if they belong to the set A,D,E,F. If they do not belong to the set A,D,E,F then -1 mark for each additional incorrect answer. Candidate cannot score less than 0.
		ii	B (1) C (1)	2	Accept in any order. If more than two answers given then -1 for each additional answer. Candidate cannot score less than 0.
	b		homeostasis (1)	1	Accept 'homostasis'. Do NOT accept any other spelling.
			Total	5	
			Section total	42	

A222/01 Modules B4, B5 and B6 Foundation Tier

Question		Expected Answers	Marks	Rationale									
1	a	homeostasis <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></table> (1)		✓			1	If more than one box ticked then minus one for each additional box. Candidate cannot score less than 0.					
✓													
	b	body temperature <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr></table> water and salt balance <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr></table>	✓		✓		1	Both are needed for one mark. If three boxes ticked then max 1 mark.					
✓													
✓													
	c	running a marathon <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1) camping in winter <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)		✓			✓		2	If more than two boxes ticked then minus one for each additional box. Candidate cannot score less than 0.			
✓													
✓													
	d i	1 receptor (1) 2 processing centre (1) 3 effector (1)	3										
	ii	arrow drawn from hand to brain (1)	1										
	iii	internet <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1) experiment <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1) library <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)		✓			✓			✓		3	If more than three boxes ticked then minus one for each additional box. Candidate cannot score less than 0.
✓													
✓													
✓													
		Total	11										

Question		Expected Answers	Marks	Rationale
2	a	from dilute to a more concentrated <div style="display: inline-block; vertical-align: middle;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> (1)	1	If more than one box ticked then minus one for each additional box. Candidate cannot score less than 0.
	b	carbon dioxide moving out of a cell water moving into a cell oxygen moving into a cell water moving out of a cell digested food moving into a cell	<div style="display: inline-block; vertical-align: middle;"> <input type="checkbox"/> D <input type="checkbox"/> O <input type="checkbox"/> D <input type="checkbox"/> O <input type="checkbox"/> D </div> 3	5 correct (3) 4 or 3 correct (2) 1 or 2 correct (1)
	c	temperature of cell (1)	1	If more than one answer ringed ten minus 1 for each additional ring. Candidate cannot score less than 0.
	d	faster collisions <div style="display: inline-block; vertical-align: middle;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> (1)	1	If more than one box ticked then minus one for each additional box. Candidate cannot score less than 0.
Total			6	

Question		Expected Answers	Marks	Rationale																																																																													
3	a	<table border="1"> <tr><td></td><td></td><td></td><td></td><td>m</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td>g</td><td>e</td><td>n</td><td>e</td><td></td><td></td><td>g</td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td>i</td><td></td><td></td><td></td><td></td><td>a</td><td></td></tr> <tr><td></td><td>c</td><td>h</td><td>r</td><td>o</td><td>m</td><td>o</td><td>s</td><td>o</td><td>m</td><td>e</td></tr> <tr><td></td><td></td><td></td><td></td><td>s</td><td></td><td></td><td></td><td></td><td>e</td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td>i</td><td></td><td></td><td></td><td></td><td>t</td><td></td></tr> <tr><td>m</td><td>i</td><td>t</td><td>o</td><td>s</td><td>i</td><td>s</td><td></td><td></td><td>e</td><td></td></tr> </table>					m										g	e	n	e			g						i					a			c	h	r	o	m	o	s	o	m	e					s					e						i					t		m	i	t	o	s	i	s			e		5	<p>Reject 1 down if word contain the letter 'T'</p> <p>Reject 5 across if 3rd letter is not a 'T'</p> <p>Accept if answer is crossed out and correct response given next to crossed out boxes.</p>
				m																																																																													
			g	e	n	e			g																																																																								
				i					a																																																																								
	c	h	r	o	m	o	s	o	m	e																																																																							
				s					e																																																																								
				i					t																																																																								
m	i	t	o	s	i	s			e																																																																								
	b	<table border="1"> <tr><td>(B)</td><td>E</td><td>D</td><td>A</td><td>C</td></tr> </table> <p>E before D (1) D before A (1) A before C (1)</p>	(B)	E	D	A	C	3																																																																									
(B)	E	D	A	C																																																																													
		Total	8																																																																														

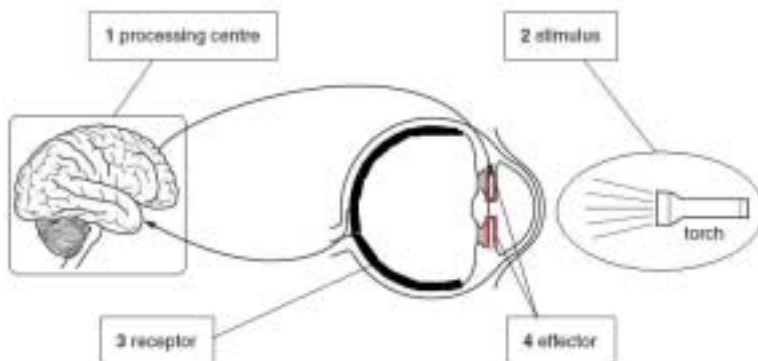
Question			Expected Answers	Marks	Rationale
4	a	i	4 (1)	1	
		ii		2	3 correct (2) 2 or 1 correct (1)
	b		embryo (1)	1	If more than one answer ringed ten minus 1 for each additional ring. Candidate cannot score less than 0.
	c		<p>cells not yet specialised <input checked="" type="checkbox"/> (1)</p> <p>develop into any other kind of cell <input checked="" type="checkbox"/> (1)</p>	2	If more than two boxes ticked then minus one for each additional box. Candidate cannot score less than 0.
Total				6	

Question		Expected Answers	Marks	Rationale												
5	a	1 brain (1) 2 spinal cord (1) 3 peripheral nervous system (1)	3	Allow PNS for Peripheral Nervous System												
	b	pupils closing in bright light <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td> </td></tr><tr><td>✓ (1)</td></tr><tr><td>✓ (1)</td></tr><tr><td> </td></tr></table> baby gripping a parent's finger			✓ (1)	✓ (1)		2	If more than two boxes ticked then minus one for each additional box. Candidate cannot score less than 0.							
✓ (1)																
✓ (1)																
	c	storage and retrieval of information <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓ (1)</td></tr><tr><td> </td></tr><tr><td> </td></tr></table>		✓ (1)			1	If more than one box ticked then minus one for each additional box. Candidate cannot score less than 0.								
✓ (1)																
	d	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>long term memory</th> <th>short term memory</th> </tr> </thead> <tbody> <tr> <td>-</td> <td>A</td> </tr> <tr> <td>B</td> <td>-</td> </tr> <tr> <td>-</td> <td>C</td> </tr> <tr> <td>D</td> <td>-</td> </tr> <tr> <td>E</td> <td>-</td> </tr> </tbody> </table>	long term memory	short term memory	-	A	B	-	-	C	D	-	E	-	2	5 correct (2) 4 or 3 correct (1) Allow any vertical order in each column
long term memory	short term memory															
-	A															
B	-															
-	C															
D	-															
E	-															
Total			8													

Question	Expected Answers	Marks	Rationale					
6	<table border="1"><tr><td>(D)</td><td>A</td><td>E</td><td>C</td><td>B</td></tr></table> A before E (1) E before C (1) C before B (1)	(D)	A	E	C	B	3	
(D)	A	E	C	B				
	Total	3						
	Section total	42						

A222/02 Modules B4, B5 and B6 Higher Tier

Question		Expected Answers	Marks	Rationale
1	a	homeostasis (1)	1	Allow any reasonable spelling
	b	blood oxygen levels <input checked="" type="checkbox"/> water content in the body <input checked="" type="checkbox"/> salt content in the body <input checked="" type="checkbox"/>	1	all three required for one mark if less than 3 boxes ticked then no marks can be awarded.
	c	used to maintain a constant level <input type="checkbox"/> reverses changes that take place <input checked="" type="checkbox"/> (1) <input checked="" type="checkbox"/> (1)	2	If more than 2 boxes are ticked then -1 for each additional tick. Candidate cannot score less than 0.
	d	1 processing centre – brain (1) 2 stimulus – torch (1) 3 receptor - retina (1) 4 effector - iris (1)	4	Processing Centre / Brain - arrow anywhere inside indicated zone Stimulus / Torch - arrow anywhere inside indicated zone Receptor / Retina – arrow touching any part of the inner layer at the back of the eye (thick line in mark scheme diagram) Effector / Iris - arrow must point clearly to the iris in front of the lens. Only one arrow needed, to top or bottom segment. Reject arrow pointing to pupil (gap in between top and bottom iris).
Total			8	



Question		Expected Answers	Marks	Rationale					
2	a	from dilute to a more concentrated <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></table> (1)		✓			1	If more than 1 box ticked then -1 for each additional tick. Candidate cannot score less than 0.	
✓									
	b	carbon dioxide moving out of a cell <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>D</td></tr><tr><td>O</td></tr><tr><td>D</td></tr><tr><td>O</td></tr><tr><td>D</td></tr></table> water moving into a cell oxygen moving into a cell water moving out of a cell digested food moving into a cell	D	O	D	O	D	3	5 correct (3) 4 or 3 correct (2) 1 or 2 correct (1)
D									
O									
D									
O									
D									
	c	temperature of cell (1)	1	If more than one response circled then no marks.					
	d	faster collisions <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></table> (1)		✓			1	If more than 1 box ticked then -1 for each additional tick. Candidate cannot score less than 0.	
✓									
Total			6						

Question		Expected Answers	Marks	Rationale																																																																													
3	a	<table border="1" style="border-collapse: collapse; text-align: center; width: 100%;"> <tr><td> </td><td> </td><td> </td><td> </td><td>m</td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td>g</td><td>e</td><td>n</td><td>e</td><td> </td><td> </td><td>g</td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td>i</td><td> </td><td> </td><td> </td><td> </td><td>a</td><td> </td></tr> <tr><td> </td><td>c</td><td>h</td><td>r</td><td>o</td><td>m</td><td>o</td><td>s</td><td>o</td><td>m</td><td>e</td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td>s</td><td> </td><td> </td><td> </td><td> </td><td>e</td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td>i</td><td> </td><td> </td><td> </td><td> </td><td>t</td><td> </td></tr> <tr><td>m</td><td>i</td><td>t</td><td>o</td><td>s</td><td>i</td><td>s</td><td> </td><td> </td><td>e</td><td> </td></tr> </table>					m										g	e	n	e			g						i					a			c	h	r	o	m	o	s	o	m	e					s					e						i					t		m	i	t	o	s	i	s			e		5	Reject 1 down if the word has a letter T. Reject 5 across if the word does not have the letter T Allow minor spelling mistakes. Accept correct words written next to the clues.
				m																																																																													
			g	e	n	e			g																																																																								
				i					a																																																																								
	c	h	r	o	m	o	s	o	m	e																																																																							
				s					e																																																																								
				i					t																																																																								
m	i	t	o	s	i	s			e																																																																								
	b	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>(B)</td><td>E</td><td>D</td><td>A</td><td>C</td></tr></table>	(B)	E	D	A	C	3	E before D (1) D before A (1) A before C (1)																																																																								
(B)	E	D	A	C																																																																													
Total			8																																																																														

Question			Expected Answers	Marks	Rationale
4	a	i	4 (1)	1	
		ii		1	all correct for one mark
	b			2	one mark for each word if both descriptions are correct If two lines are drawn from one type of cell division but one is incorrect then no marks for that cell division.
	c		have no inactive genes <input checked="" type="checkbox"/> (1) replace damaged tissue <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/>	2	If more than 2 boxes ticked then -1 for each additional tick. Candidate cannot score less than 0.
Total				6	

Question			Expected Answers	Marks	Rationale					
5	a	i		3	one mark for each of the correct labels (1) Allow synapse written in the gap but not above or below without an arrow. Arrows to receptor molecules and synaptic chemicals must touch or be obviously pointing to correct response.					
		ii	direction of impulse from left to right anywhere on the diagram.(1)	1						
	b		rapid involuntary responses <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>T</td></tr><tr><td>F</td></tr><tr><td>T</td></tr><tr><td>F</td></tr><tr><td>T</td></tr></table> simple animals use simple reflexes when reflex responses are learnt complex reflexes improve survival conditioned reflexes increase survival	T	F	T	F	T	3	5 correct (3) 4 or 3 correct (2) 1 or 2 correct (1)
T										
F										
T										
F										
T										
Total				7						

Question		Expected Answers	Marks	Rationale						
6	a	<p>Pavlov's dogs</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> <p>(1)</p> <p>no direct connection</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>✓</td></tr> </table> <p>(1)</p>		✓				✓	2	If more than 2 boxes ticked then -1 for each additional tick. Candidate cannot score less than 0.
✓										
✓										
	b		2	one mark for each correct reflex linked with the correct example and then to its correct purpose. Both lines from the example must be correct for one mark. Additional sets of lines -1.						
	c	<p>holding on to a hot plate</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>✓</td></tr> </table> <p>(1)</p> <p>going to the dentist</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>✓</td></tr> </table> <p>(1)</p> <p>not blinking</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>✓</td></tr> </table> <p>(1)</p>	✓	✓	✓	3	If more than 3 boxes ticked then -1 for each additional tick. Candidate cannot score less than 0.			
✓										
✓										
✓										
		Total	7							
		Section total	42							

Grade Thresholds

General Certificate of Secondary Education
Biology A (Specification Code J633)
January 2008 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	35	30	25	20	15	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A221/02	Raw	42	40	38	34	30	24	21	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0
A222/01	Raw	42	N/A	N/A	N/A	33	29	25	22	19	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A222/02	Raw	42	40	37	31	26	20	17	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	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

No candidates were entered for aggregation this series. First aggregation opportunity is in June 2008.

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.

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