

**Biology A**  
**Twenty First Century Science**

General Certificate of Secondary Education **J633**

## **Mark Schemes for the Units**

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**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 <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 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	<div> <div>can make poisons</div> <div>cells can be damaged</div> <div> <input type="checkbox"/>  <input checked="" type="checkbox"/>  <input type="checkbox"/> </div> <div>(1) (1)</div> </div>	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		<div> <div>has antibodies for chicken pox</div> <div> <input type="checkbox"/>  <input checked="" type="checkbox"/>  <input type="checkbox"/> </div> <div>(1)</div> </div>	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>Total</b>	<b>6</b>	

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.
			<b>Total</b>	<b>4</b>	

3	a		viruses (1)	1	If more than one answer given then score = zero
	b		<div> <div>resistant to antibiotics</div> <div> <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> </div> <div>(1)</div> </div>	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	
			<b>Total</b>	<b>4</b>	

A221/01

Mark Scheme

January 2008

Question			Expected Answers	Marks	Rationale									
4	a	i	same genes <table><tr><td>✓</td></tr><tr><td></td></tr><tr><td></td></tr></table> (1)  same fertilized egg <table><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.					
✓														
✓														
		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><tr><td>✓</td></tr><tr><td></td></tr><tr><td></td></tr></table> (1)  inherited different forms of genes <table><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.				
✓														
✓														
	c	i	father's alleles correct (1) correct combinations in offspring (1)	2	Accept Bb or bB for second box <table><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 <sup>st</sup> and 4 <sup>th</sup> arguments against 2 <sup>nd</sup> , 3 <sup>rd</sup> and 5 <sup>th</sup>	3	5 correct (3) 4 correct (2) 3 correct (1) less than 3 correct scores 0									
			Total	13										

A221/01

Mark Scheme

January 2008

Question			Expected Answers	Marks	Rationale
5	a		<div>how long ago the animal lived</div> <div><div><div></div><div>✓</div><div></div><div></div></div><div>(1)</div></div> <div>the size of the animal</div> <div><div><div></div><div>✓</div><div></div><div></div></div><div>(1)</div></div>	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.
	b		4 (1)	1	If more than one answer given then score = zero
	c		<div>11 million year old rock</div> <div><div><div></div><div>✓</div><div></div></div><div>(1)</div></div>	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		<div>prey becomes extinct</div> <div><div><div>✓</div><div>✓</div><div></div><div></div><div></div><div></div></div><div>(1)</div><div>(1)</div></div> <div>new predator</div> <div><div><div></div><div>✓</div><div></div><div></div></div><div>(1)</div></div>	3	If more than 3 boxes ticked then -1 for each additional answer.
			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
			<b>Total</b>	<b>8</b>	

			<b>Section total</b>	<b>42</b>	
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## 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.
			<b>Total</b>	<b>10</b>	

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)
			<b>Total</b>	<b>4</b>	

A221/02

Mark Scheme

January 2008

Question			Expected Answers	Marks	Rationale
3	a		<div>environmental factors</div> <div>transferring a nucleus</div> <div><div><div></div><div></div><div></div><div>✓</div><div>✓</div></div><div>(1)</div><div>(1)</div></div> <div></div> <div>2</div> <td>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.</td>	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.	
	b	i	father's alleles correct (1) correct combinations in offspring (1)	2	Accept Bb or bB for second box <div><div><div></div><div>B</div><div></div></div><div><div></div><div>Bb</div><div>bb</div></div></div>
		ii	ring around bb combination (1)	1	Allow (bb) wherever it appears
	c	i	Y (chromosome) (1)	1	Reject any additional letters.
		ii	arguments for 1 <sup>st</sup> and 4 <sup>th</sup> arguments against 2 <sup>nd</sup> , 3 <sup>rd</sup> and 5 <sup>th</sup>	3	5 correct (3) 4 correct (2) 3 correct (1)
			Total	9	

4	a	<div> <div>may give false positive</div> <div>employer may not promote him</div> <div> <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>  <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>  <input type="checkbox"/> </div> </div>	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.
	b	statement A (1) statement C (1) statement E (1)	3	If more than 3 circled then -1 for each additional answer. All circled (0) Candidate cannot score less than 0.
		<b>Total</b>	<b>5</b>	

A221/02

Mark Scheme

January 2008

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><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 environmental conditions susceptible to disease <table><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) (1) (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							

A221/02

Mark Scheme

January 2008

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.
			<b>Total</b>	<b>5</b>	
			<b>Section total</b>	<b>42</b>	

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

Question			Expected Answers	Marks	Rationale							
1	a		homeostasis <table><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><tr><td>✓</td></tr><tr><td></td></tr></table> water and salt balance <table><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><tr><td></td></tr><tr><td>✓</td></tr><tr><td></td></tr></table> (1)  camping in winter <table><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><tr><td></td></tr><tr><td>✓</td></tr><tr><td></td></tr></table> (1)  experiment <table><tr><td>✓</td></tr><tr><td></td></tr></table> (1) library <table><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								

A222/01

Mark Scheme

January 2008

Question			Expected Answers	Marks	Rationale
2	a		from dilute to a more concentrated <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px; text-align: center; line-height: 30px;">✓</div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> </div> (1)	1	If more than one box ticked then minus one for each additional box. Candidate cannot score less than 0.
	b		<div style="display: flex;"> <div style="flex: 1;"> 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> <div style="flex: 0.2; border: 1px solid black; padding: 2px;"> D O D O D </div> </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 then minus 1 for each additional ring. Candidate cannot score less than 0.
	d		faster collisions <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px; text-align: center; line-height: 30px;">✓</div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-right: 5px;"></div> </div> (1)	1	If more than one box ticked then minus one for each additional box. Candidate cannot score less than 0.
			<b>Total</b>	<b>6</b>	

A222/01

Mark Scheme

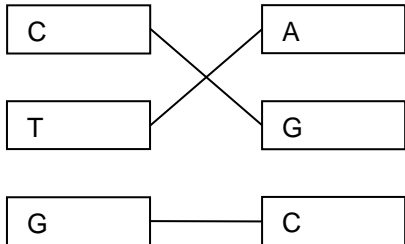
January 2008

Question			Expected Answers										Marks	Rationale																																																																													
3	a		<table><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><b>Reject</b> 1 down if word contain the letter ‘T’</p> <p><b>Reject</b> 5 across if 3<sup>rd</sup> letter is not a ‘T’</p> <p><b>Accept</b> 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><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																																																																														

A222/01

Mark Scheme

January 2008

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		<div> <div>cells not yet specialised</div> <div> <input checked="" type="checkbox"/> (1) </div> </div> <div> <div>develop into any other kind of cell</div> <div> <input checked="" type="checkbox"/> (1) </div> </div>	2	If more than two boxes ticked then minus one for each additional box. Candidate cannot score less than 0.
			<b>Total</b>	<b>6</b>	

A222/01

Mark Scheme

January 2008

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

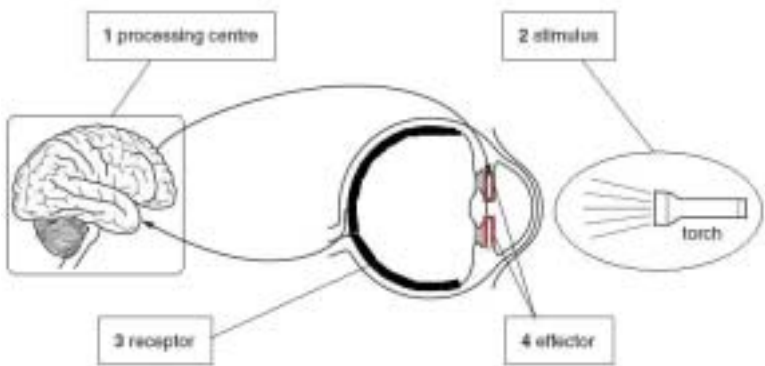
A222/01

Mark Scheme

January 2008

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>					(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	<div> <div>blood oxygen levels</div> <div>water content in the body</div> <div>salt content in the body</div> </div> <div> <input checked="" type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/>  <input checked="" type="checkbox"/> </div>	1	all three required for one mark if less than 3 boxes ticked then no marks can be awarded.
	c	<div> <div></div> <div></div> <div>used to maintain a constant level</div> <div>reverses changes that take place</div> </div> <div> <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/>  <input checked="" type="checkbox"/>  <input type="checkbox"/> </div> <div> (1)  (1) </div>	2	If more than 2 boxes are ticked then -1 for each additional tick. Candidate cannot score less than 0.
	d	<div> 1 processing centre – brain (1)  2 stimulus – torch (1)  3 receptor - retina (1)  4 effector - iris (1) </div> <div>  </div>	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 <b>in front</b> of the lens. Only one arrow needed, to top or bottom segment. <b>Reject</b> arrow pointing to pupil (gap in between top and bottom iris).
		<b>Total</b>	<b>8</b>	

A222/02

Mark Scheme

January 2008

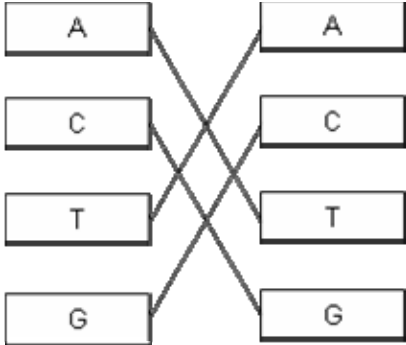
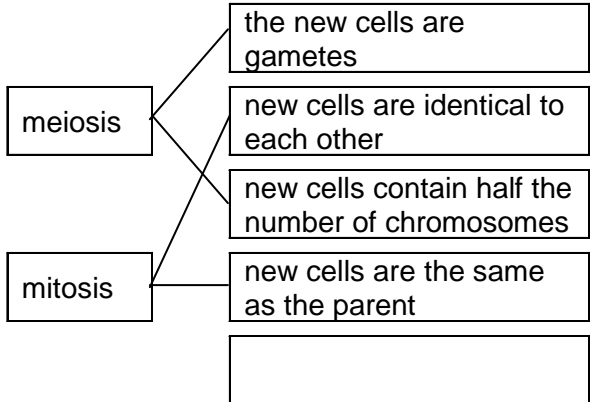
Question			Expected Answers	Marks	Rationale					
2	a		from dilute to a more concentrated <table><tr><td></td></tr><tr><td>✓</td></tr><tr><td></td></tr><tr><td></td></tr></table> (1)		✓			1	If more than 1 box ticked then -1 for each additional tick. Candidate cannot score less than 0.	
✓										
	b		carbon dioxide moving out of a cell water moving into a cell oxygen moving into a cell water moving out of a cell digested food moving into a cell <table><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>	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><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						m							5	Reject 1 down if the word <b>has</b> a letter T. Reject 5 across if the word <b>does not have</b> the letter T Allow minor spelling mistakes. Accept correct words written next to the clues.
						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		<div>(B)E D A C</div>											3	E before D (1) D before A (1) A before C (1)
			Total											8	

A222/02

Mark Scheme

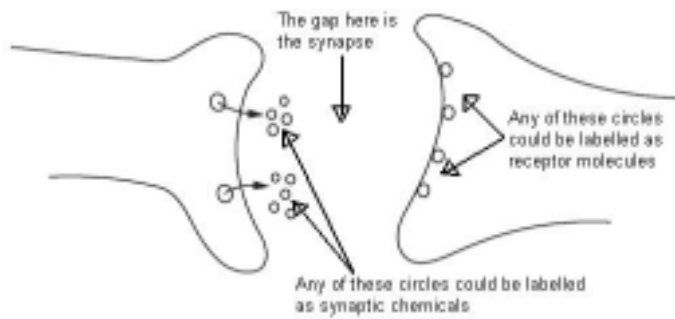
January 2008

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 <b>both</b> 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		<p>have no inactive genes <input checked="" type="checkbox"/> (1)</p> <p>replace damaged tissue <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	2	If more than 2 boxes ticked then -1 for each additional tick. Candidate cannot score less than 0.
Total				6	

A222/02

Mark Scheme

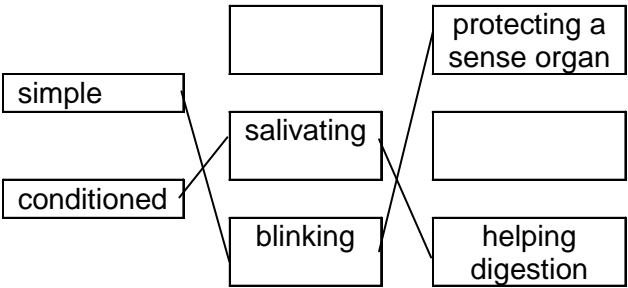
January 2008

Question			Expected Answers	Marks	Rationale
5	a	i	 <p>The gap here is the synapse</p> <p>Any of these circles could be labelled as synaptic chemicals</p> <p>Any of these circles could be labelled as receptor molecules</p>	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		<div><div>rapid involuntary responses</div><div>simple animals use simple reflexes</div><div>when reflex responses are learnt</div><div>complex reflexes improve survival</div><div>conditioned reflexes increase survival</div></div> <div><div>T</div><div>F</div><div>T</div><div>F</div><div>T</div></div>	3	5 correct (3) 4 or 3 correct (2) 1 or 2 correct (1)
			<b>Total</b>	<b>7</b>	

A222/02

Mark Scheme

January 2008

Question	Expected Answers	Marks	Rationale
6 a	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 40%;"> <p>Pavlov's dogs</p> <p>no direct connection</p> </div> <div style="width: 10%; text-align: center;"> <input type="checkbox"/>  <input checked="" type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> </div> <div style="width: 40%;"> <p>(1)</p> <p>(1)</p> </div> </div>	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	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 40%;"> <p>holding on to a hot plate</p> <p>going to the dentist</p> <p>not blinking</p> </div> <div style="width: 10%; text-align: center;"> <input type="checkbox"/>  <input checked="" type="checkbox"/>  <input checked="" type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/> </div> <div style="width: 40%;"> <p>(1)</p> <p>(1)</p> <p>(1)</p> </div> </div>	3	If more than 3 boxes ticked then -1 for each additional tick. Candidate cannot score less than 0.
	<b>Total</b>	<b>7</b>	
	<b>Section total</b>	<b>42</b>	

# 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
<b>J633</b>	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](http://www.ocr.org.uk/learners/ums_results.html)

Statistics are correct at the time of publication.

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