OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology A
Twenty First Century Science

General Certificate of Secondary Education **J633**

Mark Schemes for the Units

June 2008

J633/MS/R/08

Oxford Cambridge and RSA Examinations

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

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GCSE Twenty First Century Science - Biology A (J633)

MARK SCHEMES FOR THE UNITS

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	

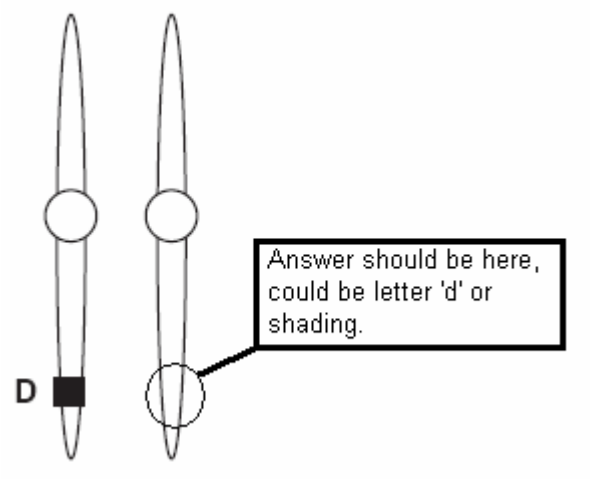
   the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out). For a two-mark question, the rationale would be:

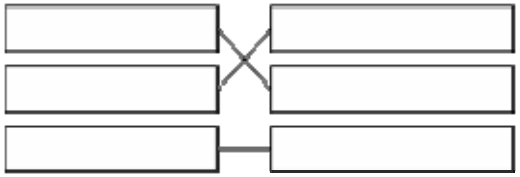
   All boxes are indicated scores 0 marks.
   All boxes blank scores 0 marks.
   All four boxes correct scores 2 marks.
   Three boxes correct scores 1 mark.
   Two boxes correct scores 1 mark.

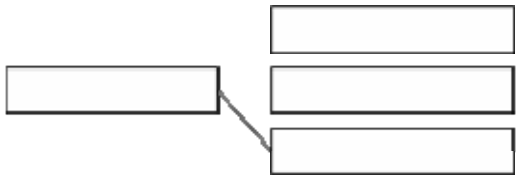
Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	×	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	×		✓		✓	✓		✓	
Score:	**2**	**2**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**NR**

A221/01 Modules B1, B2, B3 Foundation Tier

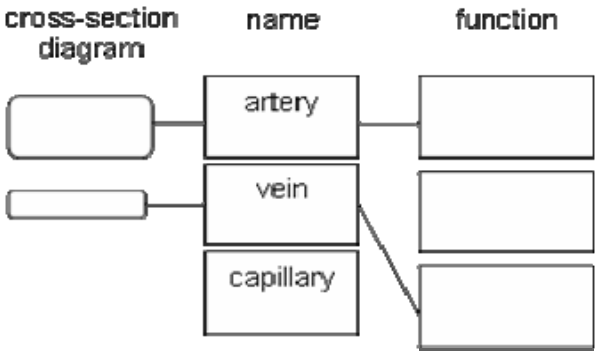
Question			Expected Answers	Marks	Rationale
1	a		short of breath ✓ (1) many chest infections ✓ (1)	2	accept ticks, crosses or shading if more than 2 responses deduct 1 mark for each incorrect response
	b		combination: dd (1); (Dd); DD (1)	2	dd must be in top box DD must be in bottom box single d = 0 single D = 0

1	**c**		same position as D but on the right hand chromosome, e.g.  	1	this can be as a shading only on the right position on the chromosome or as a written letter d. position should be the same as on left chromosome.
			Total	**5**	

Question			Expected Answers	Marks	Rationale
2	a		<table><tr><td></td><td></td></tr><tr><td>make the missing protein</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table> (1)	1	more than one response = 0 marks **accept** a clear response eg. ✓ or X or shading etc. **ignore** X if combination of ✓ and X used
	b	i	Jim	1	do **not** accept J for Jim
		ii	Marion (1) Robert (1)	2	**either** order **accept** spelling errors if clearly attempting to identify correct person **accept** M for Marion and R for Robert
		iii		2	all lines correct (2) two or one correct (1) more than one line from any left hand box negates any credit for that left hand box only
	c		<table><tr><td></td><td></td></tr><tr><td>they are unspecialised</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td>can develop into any kind of cell</td><td>✓</td></tr></table> (1) (1)	2	accept ticks, crosses or shading. if more than two responses deduct one mark for each incorrect response
			Total	**8**	

<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>3</td><td>a</td><td>i</td><td>
<table>
<tr><th>benefit</th><th>risk</th><th>neither</th></tr>
<tr><td>(✓)</td><td></td><td></td></tr>
<tr><td></td><td>✓</td><td></td></tr>
<tr><td>✓</td><td></td><td></td></tr>
<tr><td></td><td></td><td>✓</td></tr>
</table>
(1)
(1)
(1)
</td><td>3</td><td>accept ticks, crosses or shading.
more than 1 response in any row = 0 for that row
ignore any responses added to top row.</td></tr>
<tr><td></td><td></td><td>ii</td><td>safe form of the virus ✓ (1)</td><td>1</td><td>accept ticks, crosses or shading.
more than 1 response = 0</td></tr>
<tr><td></td><td>b</td><td></td><td>  </td><td>1</td><td>if more than one line from left hand box then 0 marks
ignore any links between boxes on the right hand side.</td></tr>
<tr><td></td><td>c</td><td>i</td><td>14</td><td>1</td><td>accept

14 000 000/1 000 000 or 14/1</td></tr>
<tr><td></td><td></td><td>ii</td><td>(15 000/60 000 000) x 100 (1)
=0.025% (1)</td><td>2</td><td>for correct answer without working (2)
(15 000/60 000 000) x 100 gains 1 mark or
(15 000/60 000 000) 1 mark
15/600, 1/40th or any correct ratio 1 mark</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>8</td><td></td></tr>
</table>

Question			Expected Answers	Marks	Rationale
4	a			4	1 mark for line from top diagram to name Artery. 1 mark for line from bottom diagram to name Vein. 1 mark for line from name Artery to top function. 1 mark for line from name Vein to bottom function. if two or more lines drawn from diagram or any box = 0 marks for that line. if two or more lines drawn to any box = 0 marks for that line. ignore line drawn from name capillary to middle function.
	b		C (B) E D A	3	all correct (3) or C before E (1) E before D (1) D before A (1)
	c		greater risk of heart attacks ✓ (1)	1	more than one response = 0 marks **accept** a clear response eg. ✓ or X or shading etc. **ignore** X if combination of ✓ and X used
	d		all have a correlation ✓ (1)	1	more than one response = 0 marks **accept** a clear response eg. ✓ or X or shading etc. **ignore** X if combination of ✓ and X used
			Total	**9**	

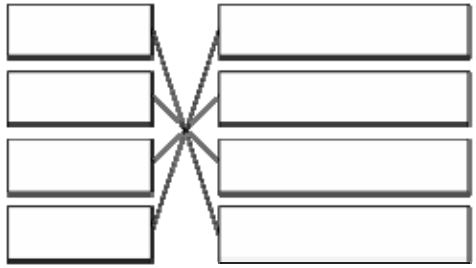
Question			Expected Answers	Marks	Rationale
5	a		life could have arrived from space ✓ (1)	1	more than one response = 0 marks **accept** a clear response eg. ✓ or X or shading etc. **ignore** X if combination of ✓ and X used
	b		3500 (1) copy (1) data (1)	3	answers must be in correct order accept spelling mistakes accept any clear unambiguous indication, e.g. numbering of list
			Total	**4**	

6			number: 6 (1); 4 (1) **allow** 5*; 5 (1); 8 (1)	4	apart from row two*, more than 1 number in any box = 0 for row two 4, 5 or 4+5 = 1 mark any other combination in box two = 0 mark
			Total	**4**	

7			evolution (1) natural selection (1) prediction (1) confident (1)	4	words must be in correct order accept spelling mistakes accept any clear unambiguous indication, e.g. numbering of list
			Total	**4**	

			Paper Total	**42**	

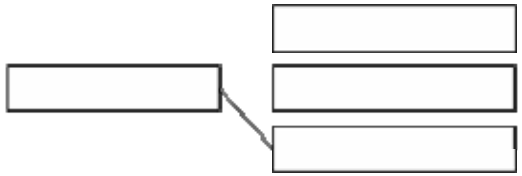
A221/02 Modules B1, B2, B3 Higher Tier

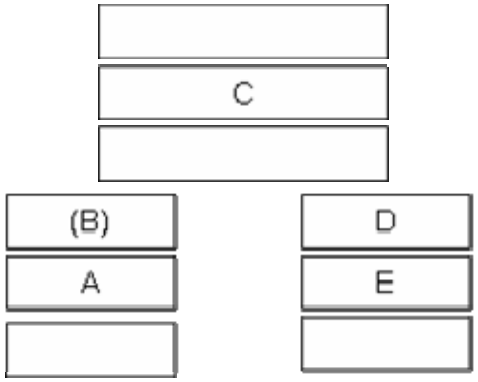
<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>1</td><td>a</td><td></td><td>  </td><td>3</td><td>all correct (3)
three or two correct (2)
one correct (1)
if more than one line from left hand box mark as incorrect</td></tr>
<tr><td></td><td>b</td><td></td><td>
<table>
<tr><td colspan="2"></td><td>Philip</td><td>Dd</td><td></td></tr>
<tr><td colspan="2"></td><td colspan="3">sperm</td></tr>
<tr><td rowspan="3">Sharon

Dd</td><td></td><td></td><td>D</td><td>d</td></tr>
<tr><td rowspan="2">eggs</td><td>D</td><td>DD</td><td>Dd</td></tr>
<tr><td>d</td><td>Dd</td><td>dd</td></tr>
</table>
</td><td>3</td><td>Philip box Dd (1)
”egg boxes” D and d (1) either order. More than one letter in “egg boxes” is wrong
fertilised egg boxes correctly filled in (1)
Dd and dD are both correct
if “egg boxes” not completed cannot award mark for fertilised egg boxes</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>6</td><td></td></tr>
</table>

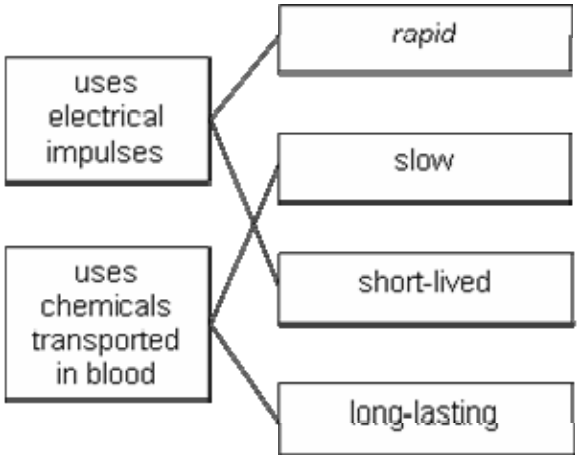
Question			Expected Answers	Marks	Rationale
2	a		<table><tr><td></td><td></td></tr><tr><td>make the missing protein</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table> (1)	1	more than one response = 0 marks **accept** a clear response eg. ✓ or X or shading etc. **ignore** X if combination of ✓ and X used
	b	i	Jim	1	do **not** accept J for Jim
		ii	Marion (1) Robert (1)	2	**either** order **accept** spelling errors if clearly attempting to identify correct person **accept** M for Marion and R for Robert
			Total	**4**	

3	a		unspecialised/undifferentiated (1) nucleus (1) clone (1)	3	**accept** nuclei must be in correct order
	b	i	C and F	1	either order is acceptable. accept any clear unambiguous indication
	b	ii	D and E	1	either order is acceptable. accept any clear unambiguous indication
			Total	**5**	

Question			Expected Answers	Marks	Rationale
4	a			1	if more than one line from left hand box then 0 marks ignore any links between boxes on the right hand side.
	b	i	14	1	accept 14 000 000/1 000 000 or 14/1
		ii	(15 000/60 000 000) x 100 =0.025%	2	for correct answer without working (2) (15 000/60 000 000) x 100 gains 1 mark **or** (15 000/60 000 000) 1 mark 15/600, 1/40th or any correct ratio 1 mark
	c		risk of death from flu is greater than risk of side effects ✓ (1) (blank) (blank)	1	more than one response = 0 marks **accept** a clear response eg. ✓ or X or shading etc. **ignore** X if combination of ✓ and X used

Question			Expected Answers	Marks	Rationale
4	d			3	mark separately C correct (1) D and E correct, must be in correct order (1), A correct (1)
	e		immune	1	
			Total	**9**	

Question			Expected Answers	Marks	Rationale
5	a		greater risk of heart attacks ☐ ☐ ✓ ☐ (1)	1	more than one response = 0 marks **accept** a clear response eg. ✓ or X or shading etc. **ignore** X if combination of ✓ and X used
	b		all have a correlation ☐ ☐ ✓ (1)	1	more than one response = 0 marks **accept** a clear response eg. ✓ or X or shading etc. **ignore** X if combination of ✓ and X used
	c		mechanism linking microorganisms ☐ ☐ ☐ ✓ (1)	1	more than one response = 0 marks **accept** a clear response eg. ✓ or X or shading etc. **ignore** X if combination of ✓ and X used
	d	i	(coronary) artery	1	**allow** arteries
		ii	The blood is at high pressure ☐ ☐ ✓ ☐ ☐ ☐ (1)	1	more than one response = 0 marks **accept** a clear response eg. ✓ or X or shading etc. **ignore** X if combination of ✓ and X used
			Total	**5**	

Question			Expected Answers	Marks	Rationale
6	a		The article provides evidence for theory 1 ✓ (1)	1	more than one response = 0 marks **accept** a clear response eg. ✓ or X or shading etc. **ignore** X if combination of ✓ and X used
	b		3500 (1) copy (1)	2	**allow** replicate / duplicate if list given any wrong answer cancels out correct answer so no mark
	c	i	nervous (1) hormone (1)	2	**do not allow** nerves/nerve cell/neurone/nerve system **allow** endocrine or hormonal for hormone but **not** named hormones eg. Adrenaline
		ii		2	mark top left (1) and bottom left (1) **independently** lines must originate at left hand box need two lines from each left hand box for mark
			Total	**7**	

Question			Expected Answers	Marks	Rationale
7	a	i	6	1	only 6 more than one number/response = 0 marks **accept** correct written statement or part statement if clear which line eg. Hunted **accept** any clear unambiguous indication
		ii	4 and 5	1	both required, either order more than two numbers/responses given = 0 marks **accept** correct written statement or part statement if clear which line **accept** any clear unambiguous indication
		b	bio	1	**allow** species / biological
			Total	**3**	

8	a		prediction (1) confident (1)	2	words must be in correct order **accept** spelling mistakes **accept** any clear unambiguous indication, e.g. numbering of list
	b		sexual reproduction ✓ mutation in sex cells ✓	1	one mark for **each** correct tick **deduct** one mark for each incorrect tick if more than two ticks used. Minimum mark 0. **accept** a clear response eg. X or shading etc **ignore** X if combination of ✓ and X used
			Total	**3**	

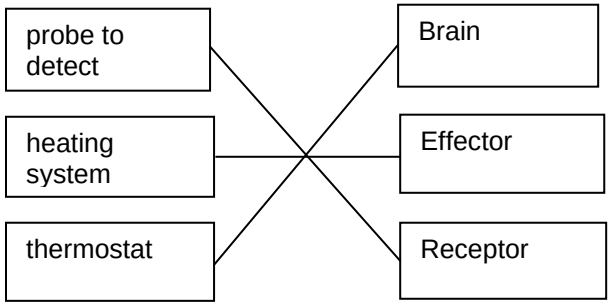
			Paper Total	**42**	

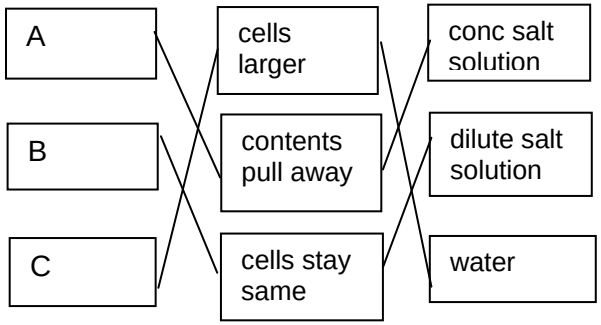
A222/01 Modules B4, B5 and B6 Foundation Tier

<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>1</td><td>a</td><td></td><td>excreting unwanted molecules (1)
balancing water levels (1)</td><td>2</td><td>if more than 2 responses delete 1 mark for each additional response
accept another clear correct response, e.g. underlining chosen answer</td></tr>
<tr><td></td><td>b</td><td></td><td><table><tr><td>sugar (glucose)</td><td>-</td><td>✓</td></tr><tr><td>water</td><td>-</td><td>✓</td></tr><tr><td>urea</td><td>✓</td><td>-</td></tr></table></td><td>2</td><td>3 correct rows = 2 marks
2 correct rows = 1 mark
1 or 0 correct = 0 marks

if ticks are correct, ignore crosses in the other boxes in each row

accept another clear correct response in each row, e.g. a cross– but only if the other box in the row is blank</td></tr>
<tr><td></td><td>c</td><td></td><td>increases (1)</td><td>1</td><td>more than one response = 0 marks
accept another clear correct response eg underlining chosen answer</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>5</td><td></td></tr>
</table>

Question			Expected Answers	Marks	Rationale
2	a		homeostasis (1)	1	more than one response = 0 marks
	b			2	look at the links as they leave the left-hand boxes 3 correct = 2 marks 2 correct = 1 mark 1 or 0 correct = 0 marks
			Total	**3**	

Question			Expected Answers	Marks	Rationale
3	a			4	look at the links as they leave the left-hand boxes left set 3 correct = 2 marks left set 2 correct = 1 mark left set 1 or 0 correct = 0 marks right set 3 correct = 2 marks right set 2 correct = 1 mark right set 1 or 0 correct = 0 marks
	b		from a dilute to a more concentrated solution through a partially permeable membrane (1)	1	more than one response = 0 marks accept another clear correct response, e.g. a cross, to indicate choice of statement
	c		add lots of water (1)	1	more than one response = 0 marks
			Total	**6**	

Question			Expected Answers	Marks	Rationale
4	a		fertilisation (1) mitosis (1) mitosis (1)	3	if more than 3 responses deduct one mark for each additional response accept another clear correct response, e.g. lines linking the correct term to each box
	b		… half that found in the parent cells. [ ] [✓] [ ] (1)	1	more than one response = 0 marks accept another clear correct response, e.g. a cross
	c		D B C A	2	B before C = 1 mark C before A = 1 mark
			Total	**6**	

Question			Expected Answers	Marks	Rationale
5	a	i	light (1)	1	more than one response = 0 marks accept another clear correct response, e.g. underlining chosen answer
	a	ii	phototropism (1)	1	more than one response = 0 marks accept another clear correct response, e.g underlining chosen answer
	b	i	B (1)	1	more than one response = 0 marks accept another clear correct response, e.g..a line linking the correct letter to the space, or circle letter B
	b	ii	unspecialised cells (1)	1	more than one response = 0 marks accept another clear correct response, e.g. underlining chosen answer
	c		hormones (1)	1	more than one response = 0 marks accept another clear correct response, e.g. underlining chosen answer
			Total	**5**	

6	a		site of genetic code (1) A site of protein synthesis (1) B	2	more than one response in each box = 0 marks accept another clear correct response, e.g. A line linking the correct letter to the box
	b		double (1) base (1)	2	each correct response = 1 mark must be in correct order accept another clear correct response, e.g. A line linking the correct term to the space
			Total	**4**	

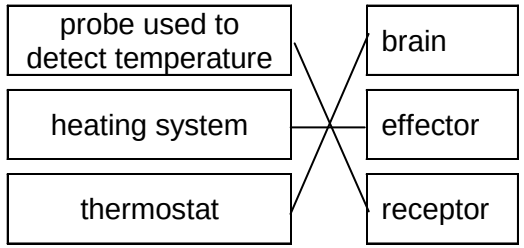
Question			Expected Answers	Marks	Rationale
7	a	i	involuntary ✓ rapid ✓	1	First and second rows only must be ticked for (1) – ignore crosses in the third and fourth rows **two correct responses** = 1 mark accept another **clear** correct response in each of the two rows eg. a cross in both – but only if the third and fourth rows are blank
		ii	C (1)	1	more than one response = 0 marks accept another clear correct response, e.g. a line linking the correct letter to the space provided
		iii	insulate neuron from neighbouring cells ✓ (1) to speed up nerve impulses ✓ (1)	2	1 mark for each correct response third and fourth rows must be ticked only to gain (2) - ignore crosses in the first and second rows accept another **clear** correct response in each of the two rows, e.g. a cross in both – but only if the first and second rows are blank
	b		to detect the stimulus ✓ (1)	1	more than one response = 0 marks accept another clear correct response, e.g. a cross
			Total	**5**	

Question			Expected Answers	Marks	Rationale
8	a		intelligence (1) language (1)	2	each correct response = 1 mark if more than two responses, delete 1 mark for each additional response accept another clear correct response eg underlining chosen answer
	b		Luke (1)	1	more than one response = 0 marks if no response, look at the diagram and accept the correct response, if indicated
			Total	**3**	

9	a		blinking your eyes in bright light ✓ (1) pulling your hand out of hot water ✓ (1)	2	1 mark for each correct response first and third rows must be ticked only to gain (2) - ignore crosses in the second, fourth and fifth rows accept another **clear** correct response in each of the two rows eg. a cross in both – but only if the first and second rows are blank
	b		brain (1) spinal cord (1)	2	1 mark for each correct response if more than 2 responses delete 1 mark for each additional response accept another clear correct response eg underlining chosen answer
	c		peripheral (1)	1	more than one response (0) accept another clear correct response eg underlining chosen answer
			Total	**5**	

			Section Total	**42**	

A222/02 Modules B4, B5 and B6 Higher Tier

Question			Expected Answers	Marks	Rationale
1	a		homeostasis (1)	1	more than one response = 0 marks
	b			2	look at the links as they leave the left-hand boxes 3 correct = 2 marks 2 correct = 1 mark 1 correct = 0 marks
	c	i	enzymes (1)	1	more than one response = 0 marks accept any other clear response e.g. underlined
		ii	sweating (1) excretion of urine (1)	2	if more than two responses deduct 1 mark for each additional response accept any other clear response, e.g. underlined
			Total	**6**	

<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>2</td><td>a</td><td></td><td><table><tr><td>concentrated sugar solution</td><td>A</td><td></td></tr><tr><td>dilute sugar solution</td><td>B</td><td></td></tr><tr><td>pure water</td><td>C</td><td></td></tr></table></td><td>2</td><td>if more than one response in each row deduct 1 mark for each additional response

3 correct = 2 marks
2 correct = 1 mark
1 or 0 correct = 0 marks</td></tr>
<tr><td></td><td>b</td><td></td><td><table><tr><td></td></tr><tr><td></td></tr><tr><td></td></tr><tr><td>✓</td></tr></table>dilute to more concentrated - partially permeable membrane</td><td>1</td><td>more than one response = 0 marks

accept any other clear response, e.g. a cross – but only if the remaining rows are empty</td></tr>
<tr><td></td><td>c</td><td></td><td>cell wall (1)</td><td>1</td><td>More than one response = 0 marks

accept any other clear response, e.g. underlined</td></tr>
<tr><td></td><td>d</td><td></td><td>the cells burst (1)</td><td>1</td><td>More than one response = 0 marks

accept any other clear response, e.g. underlined</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>5</td><td></td></tr>
</table>

Question			Expected Answers	Marks	Rationale
3	a		B (1) D (1)	2	1 mark for each correct response if more than two responses deduct 1 mark for each additional response if no response – look at the diagram and accept the correct shapes, if indicated
	b	i	active (site) (1)	1	more than one response = 0 marks
		ii	substrate concentration (1)	1	more than one response = 0 marks accept any other clear response, e.g. underlined
		iii	the temperature of the solution ☐ ☐ ☐ ✓ (1)	1	more than one response = 0 marks accept another **clear** correct response in the fourth row, e.g. a cross – but only if the first, second and third rows are blank
			Total	**5**	

Question			Expected Answers	Marks	Rationale
4	a		A - fertilisation (1) B - mitosis (1) C - mitosis (1)	3	if more than 3 responses deduct 1 mark for each additional response accept another clear correct response, e.g. lines linking the correct term to each box or correct term written on the diagram at stage A, B or C.
	b		half that found in the parent cells [ ] [✓] [ ] (1)	1	more than one response = 0 marks accept another clear correct response, e.g. a cross but only if the first and third boxes are blank
	c		D B C A	2	B before C = 1 mark C before A = 1 mark
			Total	**6**	

Question			Expected Answers	Marks	Rationale
5	a	i	number of cells ✓ width of stem ✓	1	first and fourth rows only must be ticked for (1) – ignore crosses in the second and third rows **two correct responses** = 1 mark accept another **clear** correct response in each of the two rows, e.g. a cross in both – but only if the second and third rows are blank
		ii	Mica (1) Rachel (1)	2	if more than two responses deduct 1 mark for each additional response if no response – look at the diagram and accept the correct response for each person, if indicated
	b	i	more auxin on the shaded side ✓ (1)	1	more than one response = 0 marks accept another **clear** correct response in the first row, e.g. a cross – but only if the second and third rows are blank
		ii	rate of cell growth increases (1)	1	More than one response = 0 marks accept any other clear response e.g. underlined
			Total	**5**	

6	a		(2) 3 1 2	2	3 correct = 2 marks 2 correct = 1 mark 1 or 0 correct = 0 marks
	b		1 (1)	1	more than one response = 0 marks accept any other clear response e.g. underlined
			Total	**3**	

Question			Expected Answers	Marks	Rationale
7	a	i	involuntary ✓ rapid ✓	1	first and second rows only must be ticked for (1) – ignore crosses in the third and fourth rows **two correct responses** = 1 mark accept another **clear** correct response in each of the two rows e.g. a cross in both – but only if the third and fourth rows are blank
		ii	C (1)	1	more than one response = 0 marks accept another clear correct response e.g. a line linking the correct letter to the space provided
		iii	to insulate the neuron ✓ (1) to speed up nerve impulses ✓ (1)	2	1 mark for each correct response third and fourth rows must be ticked only to gain (2) - ignore crosses in the first and second rows accept another **clear** correct response in each of the two rows e.g. a cross in both – but only if the first and second rows are blank
	b		to detect the stimulus ✓ (1)	1	more than one response = 0 marks accept another clear correct response e.g. a cross
			Total	**5**	

Question			Expected Answers	Marks	Rationale
8	a		D C A B	3	4 correct = 3 marks 3 correct = 2 marks 2 correct = 1 mark 1 or 0 correct = 0 marks
	b		decrease (1)	1	more than one response = 0 marks accept any other clear response e.g. underlined
	c		1 → can no longer transmit impulses Is not affected 2 → continues to transmit impulses	2	correct top line = 1 mark correct lower line = 1 mark if two or more lines lead from box 1 – do **not** award the first mark if two or more lines lead from box 2 – do **not** award the second mark
	d		increases (1)	1	more than one response = 0 marks accept any other clear response e.g. underlined
			Total	**7**	

			Paper Total	**42**	

A223/01 Ideas in Context and Unit B7 – Foundation

Question			Expected Answers	Marks	Rationale
1	a	i	disease causing (1)	1	**reject** examples **accept** make you ill
		ii	organism on which the pathogen lives (1)	1	**reject** examples
	b		any **two** from: host does not die (1) pathogen does not die (1) that means pathogen will be passed on/ more time to reproduce (1)	2	maximum 2
	c	i	smallpox (virus)	1	
		ii	any **two** from: mumps (virus) (1) diphtheria bacterium (1) whooping cough (virus)(1) pneumonia bacteria tuberculosis (bacteria) (1) parainfluenza (virus) (1)	2	maximum 2
		iii	pure chance (1) competition (1)	2	

1	**d**		any **two** from: have evidence / data / experiment; (1) publishing / talk with other scientists; (1) (peer) reviews / work replicated; (1)	2	maximum 2 **ignore** 'proof' or 'scientist prove it' for first marking point
	e		any **two** from: symptoms / reaction / example of symptom e.g. headache (1) unwanted effects / unexpected (1) clear that it is caused by the vaccine / treatment (1)	2	maximum 2
			Total	**13**	

Question			Expected Answers	Marks	Rationale
2	**a**	**i**	carbon dioxide (1) oxygen (1)	2	**accept** correct symbols
		ii	sun / light	1	
	b		for energy (1) for storage / insoluble (1) to make things they need/ use in other processes / named examples e.g. chlorophyll/cellulose/ enzymes (1)	3	
	c	**i**	something which stops photosynthesis going any faster (1)	1	**accept** it is a limiting factor for photosynthesis
		ii	give them more light owtte (1)	1	r**eject** put in a greenhouse
		iii	increase temperature (1) increase carbon dioxide concentration (1)	2	
			Total	**10**	

Question			Expected Answers	Marks	Rationale
3	a		cell wall / capsule / slime coat (1) (cell) membrane (1) DNA / chromosomes / genes (1)	3	 **reject** nucleus and plasmid **allow** genetic information
	b		**any three from** the following ideas: identify gene (1) cut / isolate gene (1) idea of vector (1) use of enzyme (1) transfer / insert gene (1) bacteria divides (1) communication (1) QWC	4	maximum 3 from list each step must be biologically correct for each mark do not give mark for bacteria produces insulin QWC (1) needs only one read through to make grammatical sense even if content is wrong
	c		farmers make more profit (1) people have the right to decide (1) it is morally wrong (1)	3	**accept** other correct examples
	d		any **three** from: antibiotics / penicillin etc. (1) (single cell) protein / Mycoprotein / Quorn etc. (1) enzymes / rennin / cheese etc. (1) biodiesel / alcohol (1)	3	maximum 3 **allow** hormones; vaccines; drugs **ignore** medicine and named steroid hormones **accept** correctly named products e.g. penicillin
			Total	**13**	

Question			Expected Answers	Marks	Rationale
4	a		bone (1) ligaments (1) muscles (1) tendons (1)	4	
	b	i	structure 1: cartilage (1) structure 2: synovial fluid (1)	2	
		ii	protects bone (1) cushioning effect (1) lubricates joint (1) reduces friction/easier movement (1)	2	maximum 2
	c		pain / swelling/ difficult to move joint (1) rest / ice / cold compress / elevation / support it (1)	2	**allow** 'RICE'(acronym) (for 1) **reject** bandage
			Total	**10**	

Question			Expected Answers	Marks	Rationale
5	a	i	human	1	
		ii	flea	1	
	b	i	named parasite e.g. tapeworm/ leech/ hair lice / mosquito	1	**reject** flea
		ii	**tapeworm** hooks/ suckers for attachment; thick cuticle / skin so not attacked by enzymes/resistant to the body chemicals so is not killed; both male and female so no need to find mate; flat so easy to absorb food/ large surface area; no intestines since food already digested; **leech** suckers for attachment; sharp teeth to pierce skin; can last long time between meals; chemicals to stop blood clotting; **hair lice/ nits** claws to hold on to hair; eggs (nits) attached to hair to avoid being dislodged; piercing mouthparts to get through skin; sucking mouthparts to suck up blood; small/ camouflaged so difficult to see; **mosquito** piercing mouthparts to get through skin; chemical to stop blood clotting; pumping action to suck up blood; wings to fly to find a new host. large number of eggs producing lots of offspring	2	maximum 2 must relate to the named parasite in part b(i)

Question			Expected Answers	Marks	Rationale
5	c		B (1) D (1)	2	
	d		cause disease (1) reduction of food (1)	2	
			Total	**9**	

A223/02 Ideas in Context and Unit B7 – Higher

Question			Expected Answers	Marks	Rationale
1	a		idea of reproduction (of pathogen) (1) idea of harm / disease OR pathogen gets some benefit (1) idea of spreading to other organisms (1)	3	**ignore** scientists prove it
	b		Idea of change e.g. flu (virus) mutates / antigens change (1) old vaccine / antibodies / wbc or immune system will not work (1)	2	**accept** flu becomes immune for second marking point **do not accept** people become <u>less</u> immune OR new type of flu
	c		the greater the survival time outside the body the greater the number of deaths caused (per 100 000 people infected) (1)	1	**accept** positive correlation

1	**d**	**i**	smallpox kills (more) people (1) can live (longer) outside the human body (1) ORA	2	**accept** tuberculosis, diphtheria, whooping cough as examples unless reverse argument given
		ii	any **two** from: have evidence / data / experiment (1) publishing / talk with other scientists (1) (peer) reviews / work replicated (1)	2	maximum 2 **ignore** 'proof' or 'scientist prove it' for first marking point
	e		any **two** from: symptoms / reaction / example of symptom e.g. headache (1) unwanted effects / unexpected (1) clear that it is caused by the vaccine / treatment (1)	2	maximum 2
			Total	**12**	

Question			Expected Answers	Marks	Rationale
2	a		any **two** from: shortness of breath (1) tired / weak / lack of energy (1) joint pains (1) block blood vessels / no oxygen (1) red blood cells going sickle shaped / change shape (1)	2	maximum 2 **ignore** blood clots / bad circulation
	b		idea of mutated / faulty (allele/ gene) (1) which changes / codes the haemoglobin (1)	2	**accept** haemoglobin S (1) **ignore** reference to dominant and recessive
	c		has only one (faulty) allele / heterozygous (1) idea of few or no symptoms (1)	2	**accept** carries only one allele (1) **accept** does not have sickle cell anaemia **reject** incorrect reference to gene
	d		idea of gives resistance to malaria (1)	1	
	e		resistance to (malaria) means sickle cell (allele) / carriers survives (1) non-carriers likely to die (1) survivors breed / pass on (sickle cell allele) to next generation (1)	3	error carried forward from 2d better chance of survival = (2) more survive = (2)
			Total	**10**	

Question			Expected Answers	Marks	Rationale
3	a		(cell) wall / capsule / slime coat (1) (cell) membrane (1) DNA / chromosomes / genes (1)	3	 **reject** nucleus and plasmid **allow** genetic information
	b		any **three** from the following ideas: identify gene (1) cut / isolate gene (1) idea of vector (1) use of enzyme (1) transfer / insert gene (1) bacteria divides (1) communication (1) QWC	4	maximum 3 from list each step must be biologically correct for each mark. do not give mark for bacteria produces insulin. QWC 1 Needs only one read through to make grammatical sense even if content is wrong
	c		farmers make more profit (1) people have the right to decide (1) it is morally wrong (1)	3	**accept** other correct examples
	d		any **three** from: antibiotics / penicillin etc (1) (single cell) protein / mycoprotein / Quorn etc. (1) enzymes / rennin / cheese etc (1) biodiesel / alcohol (1)	3	maximum 3 **allow** hormones; vaccines;drugs; **ignore** medicine and named steroid hormones **accept** correctly named products e.g. penicillin
			Total	**13**	

Question			Expected Answers	Marks	Rationale
4	a		ATP (1)	1	
	b		(more) energy needed (1) oxygen and glucose (supply energy) (1)	2	oxygen and glucose supply energy = 2
	c	i	not enough oxygen / oxygen needed (1) produces lactic acid (1)	4	mark both sections together
		ii	to remove carbon dioxide (1) break down (lactic) acid (1)		
	d		**advantage** oxygen not needed (1) **disadvantage** oxygen / debt has to be repaid / produces less energy / produces lactic acid / muscle pain (1)	2	**allow** still produce energy by only using glucose **ignore** faster / burst of energy **allow** oxygen debt produced
			Total	**9**	

<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>5</td><td>a</td><td></td><td>component function
red blood cells/haemoglobin carry oxygen (1)

white blood cells/antibodies kill microbes (1)

platelets help clot blood (1)</td><td>3</td><td>both components and function have to be correct for 1 mark.

allow plasma carries dissolved substances / food / heat / hormones / rbc / wbc / antibodies
allow different types of white blood cells</td></tr>
<tr><td></td><td>b</td><td></td><td>has AB <u>antigens / surface proteins</u> (1)
on his <u>red</u> blood cells (1)</td><td>2</td><td>allow reverse argument
ignore reference to alleles</td></tr>
<tr><td></td><td>c</td><td>i</td><td>O (1)</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>ii</td><td>A and B (1)</td><td>1</td><td>both required</td></tr>
<tr><td></td><td>d</td><td>i</td><td><table><tr><td></td><td></td><td colspan="2">father</td></tr><tr><td></td><td></td><td>A</td><td>O</td></tr><tr><td rowspan="2">mother</td><td>B</td><td>AB</td><td>BO</td></tr><tr><td>O</td><td>AO</td><td>OO</td></tr></table></td><td>2</td><td>allow any two correct for (1)

allow each pair of letters to be either way round e.g. AB or BA

accept A for AO, B for BO and O for OO</td></tr>
<tr><td></td><td></td><td>ii</td><td>AB (1)
A and B and O (1)</td><td>2</td><td>reject AO BO OO as alternatives to A, B, O</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>11</td><td></td></tr>
</table>

Grade Thresholds

General Certificate of Secondary Education
Biology A (Specification Code J633)
June 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	30	25	20	16	12	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A221/02	Raw	42	36	32	26	20	13	9	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	28	24	20	17	14	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A222/02	Raw	42	36	31	25	20	15	12	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0
A223/01	Raw	55	N/A	N/A	N/A	28	23	18	13	8	0
	UMS	100	N/A	N/A	N/A	60	50	40	30	20	0
A223/02	Raw	55	47	39	30	21	16	13	N/A	N/A	0
	UMS	100	90	80	70	60	50	45	N/A	N/A	0
A229	Raw	40	33	29	25	21	17	13	10	7	0
	UMS	100	90	80	70	60	50	40	30	20	0
A230	Raw	40	33	30	26	23	19	16	13	10	0
	UMS	100	90	80	70	60	50	40	30	20	0

A229/A230 (Coursework) - The grade thresholds have been determined on the basis of the work that was presented for award in June 2008. The threshold marks will not necessarily be the same in subsequent awards.

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	13.8	50.1	81.0	94.5	98.7	99.7	100.0	100.0	100.0	11 730

12 143 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.

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