OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology A

General Certificate of Secondary Education

Unit **A221/01**: Modules B1, B2, B3 (Foundation Tier)

Mark Scheme for January 2012

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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Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
not/reject	answers which are not worthy of credit
ignore	statements which are irrelevant - applies to neutral answers
allow/accept	answers that can be accepted
(words)	words which are not essential to gain credit
words	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	alternative wording
ORA	or reverse argument

Available in scoris to annotate scripts

	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	no benefit of doubt

	reject
	correct response
	draw attention to particular part of candidate's response
	information omitted

Subject-specific Marking Instructions

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

b. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

E.g.

For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

This would be worth 1 mark.

c. The list principle:
If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, e.g. 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.

d. Marking method for tick boxes:

Always check the additional guidance.

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.
If there is at least one tick, ignore crosses. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses.
Credit should be given for each box correctly ticked. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

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 <u>should be blank</u> (or have indication of choice crossed out).

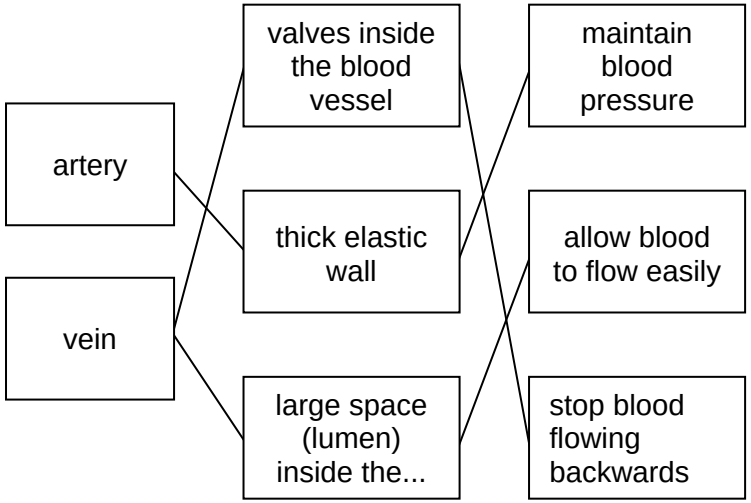
Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	×	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	×		✓		✓	✓		✓	
Score:	**2**	**2**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**NR**

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1</td><td>(a)</td><td></td><td>nucleus (1)</td><td>1</td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td><table><tr><td>… are instructions for a cell.</td><td>✓</td></tr><tr><td>… transport oxygen around the cell.</td><td></td></tr><tr><td>… release energy from glucose.</td><td></td></tr><tr><td>… code for making proteins.</td><td>✓</td></tr><tr><td>… speed up cell reactions.</td><td></td></tr></table></td><td>2</td><td>accept any clear indication of response.</td></tr>
<tr><td></td><td>(c)</td><td></td><td><table><tr><td>…structures that make up chromosomes.</td><td>✓</td></tr><tr><td>…areas of cytoplasm.</td><td></td></tr><tr><td>…part of the cell membrane.</td><td></td></tr><tr><td>…sections of very long DNA molecules.</td><td>✓</td></tr><tr><td>...made of proteins.</td><td></td></tr></table></td><td>2</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>5</td><td></td></tr>
</table>

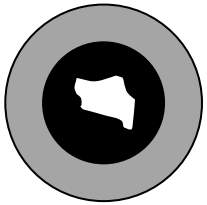
<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>2</td><td>(a)</td><td></td><td>3rd box from bottom shaded on Anita's chromosome (1)
  </td><td>1</td><td>accept clear indication of correct response
if more than 1 box shaded 0 marks</td></tr>
<tr><td></td><td>(b)</td><td></td><td>alleles (1)
recessive (1)</td><td>2</td><td></td></tr>
<tr><td></td><td>(c)</td><td></td><td><table>
<tr><td>Anita has lived with her parents for so long she has grown to look like them.</td><td></td></tr>
<tr><td>Anita has inherited a combination of alleles from both parents.</td><td>✓</td></tr>
<tr><td>Children always look like their parents.</td><td></td></tr>
<tr><td>Anita has inherited more alleles from her mother than she did from her father.</td><td></td></tr>
</table></td><td>1</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>4</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance
3	(a)		whether to try for / have children / become pregnant (1)	1	**ignore** "test the child" or abortion **allow P**re **I**mplantation **G**enetic **D**iagnosis **allow** adoption
	(b)		**any two from:** thick / sticky mucus; difficulty breathing / cough / lung infections; difficulty digesting / pancreas blocked / malnutrition / weight loss; sterility; salty sweat;	1	
	(c)	(i)	abortion / termination (1)	1	
		(ii)	Andy AND Stella (1)	1	**allow** Stella AND Andy
		(iii)	**any two from:** **genetic factors e.g.** individuals vary / different people live to different ages with cystic fibrosis / severity of cystic fibrosis varies ; **environmental factors e.g.** other disease /accident / cure found / medicines /treatment; **lifestyle factors e.g.** diet / economic / amount of exercise	2	must give specific examples to score marks
			Total	**6**	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>4</td><td>(a)</td><td></td><td>virus (1)</td><td>1</td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td><table><tr><th></th><th>true</th><th>false</th></tr><tr><td>Over time bacteria become resistant to antibiotics.</td><td>✓</td><td></td></tr><tr><td>Antibiotics should not be used on mild infections.</td><td>✓</td><td></td></tr><tr><td>Antibiotics are tested for safety on human cells grown in the laboratory.</td><td>✓</td><td></td></tr><tr><td>Patients should stop taking the antibiotic once they feel better.</td><td></td><td>✓</td></tr><tr><td>Antibiotics are not tested on healthy people because it would be a waste of</td><td></td><td>✓</td></tr></table></td><td>2</td><td>5 correct = 2 marks
4 correct = 1 marks</td></tr>
<tr><td></td><td>(c)</td><td></td><td><table><tr><td>... a safe form of the disease-causing microorganism.</td><td>✓</td></tr><tr><td>... a medicine that cures the disease.</td><td></td></tr><tr><td>... an extract made from wild plants and herbs.</td><td></td></tr><tr><td>... a sample of white blood cells.</td><td></td></tr></table></td><td>1</td><td></td></tr>
<tr><td></td><td>(d)</td><td></td><td>idea of structural change / antigen changes / mutation (1)
antibody / white blood cell no longer works / fits (1)</td><td>2</td><td>accept “changes appearance”</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>6</td><td></td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>5</td><td>(a)</td><td></td><td>
<table>
<tr><td>Heart muscle receives all its oxygen from the blood inside the heart.</td><td></td></tr>
<tr><td>The heart muscle rests between beats, so it does not need its own blood supply.</td><td></td></tr>
<tr><td>The heart muscle has its own blood supply because it needs lots of oxygen and glucose.</td><td>✓</td></tr>
<tr><td>The heart muscle has its own blood supply so that it can receive carbon dioxide.</td><td></td></tr>
</table>
</td><td>1</td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td>


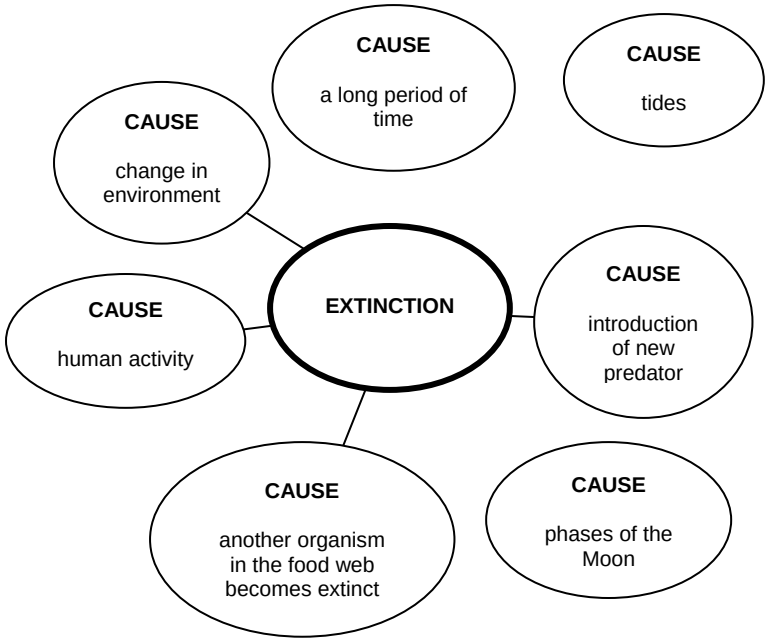
</td><td>2</td><td>LHS correct = 1
RHS correct = 1</td></tr>
<tr><td></td><td>(c)</td><td></td><td>any two from:
publish results;
peer review / having it checked ;
replication / test to see if it works;</td><td>2</td><td>publish in a peer review journal = 2 marks
ignore details of testing on healthy volunteers / cells etc</td></tr>
</table>

Question			Answer	Marks	Guidance
5	(d)		<table><tr><td>cigarette smoking</td><td></td></tr><tr><td>regular exercise</td><td>✓</td></tr><tr><td>excess alcohol</td><td></td></tr><tr><td>low fat diet</td><td>✓</td></tr><tr><td>poor diet</td><td></td></tr><tr><td>stress</td><td></td></tr></table>	1	both for 1 mark
	(e)	(i)		2	layer of fat shown inside = 1 mark connected to, and no change to artery wall = 1 mark
		(ii)	reduces blood flow (1) so heart gets less oxygen (1)	2	accept reduces blood pressure (to the heart)
			Total	**10**	

Question			Answer	Marks	Guidance
6			<table><tr><td>View 2 required imagination and creativity in the development of the explanation.</td><td>✓</td></tr><tr><td>View 1 contains data and is an explanation.</td><td></td></tr><tr><td>View 2 conflicts with view 1.</td><td>✓</td></tr><tr><td>View 3 accounts for all the relevant scientific observations.</td><td></td></tr><tr><td>View 1 and view 3 are supported by divergence of the hominid species.</td><td></td></tr></table>	2	
			Total	**2**	

7			million (1) DNA (1) copy (1)	3	
			Total	**3**	

8			**any four from:** certain characteristics kept; involves sexual reproduction / genes / offspring; involves choice; humans choose / control (characteristics); quicker; not random;	4	**accept** 'you' = human **ignore** breeding
			Total	**4**	

Question			Answer	Marks	Guidance
9				2	4 only correct = 2 3 only correct = 1
			Total	**2**	

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