

**Biology A**

General Certificate of Secondary Education

Unit **A221/02**: Modules B1, B2, B3 (Higher Tier)

**Mark Scheme for January 2012**

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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

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

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

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

<b>Edinburgh</b>	
<b>Manchester</b>	
<b>Paris</b>	
<b>Southampton</b>	

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).

<b>Edinburgh</b>			✓			✓	✓	✓	✓	
<b>Manchester</b>	✓	x	✓	✓	✓				✓	
<b>Paris</b>				✓	✓		✓	✓	✓	
<b>Southampton</b>	✓	x		✓		✓	✓		✓	
<b>Score:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>NR</b>

Question		Answer	Marks	Guidance
1	(a)	centre of X anywhere inside nucleus (1)	1	
	(b)	(i) recessive (1)	1	
		(ii) 3 <sup>rd</sup> and 4 <sup>th</sup> (1) 7 <sup>th</sup> and 8 <sup>th</sup> (1) 9 <sup>th</sup> (1)	3	if individuals are circled then minus 1 mark for more than 5 circles.  if a pair is circled, count single circle around pair as 2 circles.
		(iii) 50% (1)	1	
	(c)	(i) B or Cc (1)	1	mark lost if any other answers given
		(ii) A or CC (1) F or hh (1)	2	must be clear that CC is capital letters  minus 1 mark for each additional incorrect response.
<b>Total</b>			<b>9</b>	

Question		Answer	Marks	Guidance
2	(a)	whether to try to have children / become pregnant (1)	1	<b>ignore</b> “test the child” or abortion <b>accept</b> consider adoption and Pre Implantation Genetic Diagnosis
	(b)	<b>any two from:</b> 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	<b>accept</b> either way round
	(iii)	<b>any two from:</b> <b>genetic factors e.g.</b> individuals vary / different people live to different ages with cystic fibrosis / severity of CF varies ;  <b>environmental factors e.g.</b> other disease / accident / cure found / medicines / treatment;  <b>lifestyle factors e.g.</b> diet / economic / amount of exercise ;	2	must give specific examples to score marks
		<b>Total</b>	<b>6</b>	

Question		Answer	Marks	Guidance										
3	(a)	(MMR) vaccinations cause autism (1)	1											
	(b)	if other results are the same (1) more evidence / reliable ; shows up mistakes / experiment wrongly carried out ;	2	<b>ignore</b> accurate / true / correct <b>ignore</b> replicate the claim										
	(c) (i)	between years 90-91 (1)	1	<b>accept</b> 91-90										
	(ii)	no because rates of vaccination dropping and rates of autism rising (1)  OR  the more vaccination the less autism / the less vaccination the more autism (1)	1	if "yes" then zero marks. no mark awarded for just saying "no"  <b>reject</b> no because as rates of vaccination rises rates of autism fall										
	(d)	<table border="1"> <tbody> <tr> <td>The vaccine is not 100% effective.</td> <td>T</td> </tr> <tr> <td>Some parents would prefer their children to have three separate vaccines.</td> <td>V</td> </tr> <tr> <td>It is difficult to keep track of who has been vaccinated.</td> <td>T</td> </tr> <tr> <td>The vaccine has been in short supply at times.</td> <td>T</td> </tr> <tr> <td>The worry over autism has reduced uptake of the vaccine.</td> <td>V</td> </tr> </tbody> </table>	The vaccine is not 100% effective.	T	Some parents would prefer their children to have three separate vaccines.	V	It is difficult to keep track of who has been vaccinated.	T	The vaccine has been in short supply at times.	T	The worry over autism has reduced uptake of the vaccine.	V	3	5 correct = 3 marks 4 correct = 2 marks 3 correct = 1 mark
The vaccine is not 100% effective.	T													
Some parents would prefer their children to have three separate vaccines.	V													
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The vaccine has been in short supply at times.	T													
The worry over autism has reduced uptake of the vaccine.	V													
	(e)	as more people are vaccinated there is less chance of someone with measles meeting a non vaccinated person (1) so less chance of disease being passed on / decrease in numbers with disease (1)	2	must get first marking point before second marking point is awarded.										
<b>Total</b>			<b>10</b>											



Question		Answer	Marks	Guidance
4		Individuals grow to fit changes in their environment.		3 minus one 1 mark for each additional incorrect response.
		Random mutations occur in genes.	✓	
		Mutations occur in non-sex cells.		
		Genes may contain two alleles that are the same or different.		
		Organisms that have mutated genes cannot survive.		
		Mutated genes in sex cells can be passed on to the offspring.	✓	
		Two clones can grow into two different species.		
		The combined effects of changes in genes, environmental changes and natural ...	✓	
<b>Total</b>			<b>3</b>	

Question	Answer	Marks	Guidance
5		2	5 correct = 2 marks 3 or 4 correct = 1 mark
	<b>Total</b>	<b>2</b>	

Question		Answer	Marks	Guidance
6		View 2 required imagination and creativity in the development of the explanation.	✓	2 minus 1 mark for each additional incorrect response
		View 1 contains data and is an explanation.		
		View 2 conflicts with view 1.	✓	
		View 3 accounts for scientific observations.		
		View 1 and view 3 is supported by divergence of the hominid species.		
		<b>Total</b>	<b>2</b>	

Question		Answer	Marks	Guidance
7		<p><b>any four from:</b>            certain characteristics are kept;            involves sex rep / genes / offspring;            involves choice;</p> <p>humans choose / control (characteristics);            quicker;            not random;</p>	4	<p><b>accept</b> 'you' = human</p> <p><b>ignore</b> breeding</p>
<b>Total</b>			<b>4</b>	
8	(a)	<p>Idea that smaller fish or shrimp population could go down because turtles will increase feeding on them ;</p> <p>idea that smaller fish or shrimp population could go up because more phytoplankton to feed on / less crabs eating them;</p> <p>so no change in food supply for large fish / so large fish population unchanged ;</p>	3	<p>must get first two marks before third mark awarded</p>
	(b)	<p>compete (1)            indirect (1)            rapid (1)</p>	3	
<b>Total</b>			<b>6</b>	

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