



GCSE

Biology A

General Certificate of Secondary Education

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

Mark Scheme for June 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.

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A221/02

Mark Scheme










June 2012

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

A221/02

Mark Scheme

June 2012

	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.

Eg

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.

A221/02

Mark Scheme

June 2012

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, eg 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, eg 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.

Eg 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).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

- e. For answers marked by levels of response:
- Read through the whole answer from start to finish**
 - Decide the level** that **best fits** the answer – match the quality of the answer to the closest level descriptor
 - To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

- iv. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

A221/02

Mark Scheme

June 2012

Question			Answer	Mark	Guidance																
1	(a)		Enzymes (1) proteins (1)	2	deduct 1 mark for each additional response accept any clear indication of responses eg. ticks, underlined																
	(b)	(i)	dominant	1	if more than 1 response = 0 marks accept any clear indication of a response eg. tick, underlined																
		(ii)	50%	1	if more than 1 response = 0 marks accept any clear indication of a response eg. tick, underlined																
	(c)		<table><tr><td>The first generation only has males with Huntington's disorder.</td><td></td></tr><tr><td>Males can inherit the disorder from their mother.</td><td>✓</td></tr><tr><td>Huntington's disorder is passed on through the genes.</td><td></td></tr><tr><td>The symptoms of the disorder do not appear until a person is in their forties.</td><td></td></tr><tr><td>Both males and females can have Huntington's disorder.</td><td>✓</td></tr><tr><td>Huntington's disorder affects nervous tissue.</td><td></td></tr><tr><td>There are two alleles for the gene that can cause Huntington's disorder.</td><td></td></tr><tr><td>Females can inherit the disorder from their father.</td><td>✓</td></tr></table>	The first generation only has males with Huntington's disorder.		Males can inherit the disorder from their mother.	✓	Huntington's disorder is passed on through the genes.		The symptoms of the disorder do not appear until a person is in their forties.		Both males and females can have Huntington's disorder.	✓	Huntington's disorder affects nervous tissue.		There are two alleles for the gene that can cause Huntington's disorder.		Females can inherit the disorder from their father.	✓	3	accept any clear indication of responses eg. crosses if ticks not shown, shaded boxes if more than 3 responses deduct 1 mark for each additional response
The first generation only has males with Huntington's disorder.																					
Males can inherit the disorder from their mother.	✓																				
Huntington's disorder is passed on through the genes.																					
The symptoms of the disorder do not appear until a person is in their forties.																					
Both males and females can have Huntington's disorder.	✓																				
Huntington's disorder affects nervous tissue.																					
There are two alleles for the gene that can cause Huntington's disorder.																					
Females can inherit the disorder from their father.	✓																				
	(d)	(i)	child inherits recessive/normal allele from her mother (1) child inherits recessive/normal allele from her father (1)	2	ignore reference to Jane as a heterozygote accept converse argument clear reference to both parents in correct context = 2 marks accept child only has recessive alleles = 1 mark																
		(ii)	Jane AND Wendy	1	accept in either order																
			Total	10																	

A221/02

Mark Scheme

June 2012

Question			Answer	Mark	Guidance
2	(a)		<p><i>any 2 from:</i></p> <p>idea of chest infections/coughing/breathing difficulties;</p> <p>thick/build up of/ too much mucus/ production of phlegm;</p> <p>difficulty digesting food/digestive system not working correctly/ difficulty in gaining weight/ large (smelly) stools;</p> <p>sterility;</p>	1	<p>2 correct responses = 1 mark</p> <p>mark responses across the two lines available, treat responses as a list</p> <p>accept correct reference to pancreas, if qualified</p> <p>accept any other correctly named symptom eg. sinusitis, arthritis, incontinence, diabetes, skinny/thin</p> <p>ignore weight loss</p>
	(b)	(i)	6	1	<p>if more than 1 response = 0 marks</p> <p>accept any clear indication of a response</p>
		(ii)	2	1	<p>if more than 1 response = 0 marks</p> <p>accept any clear indication of a response</p>
		(iii)	1 AND 5	1	<p>if more than 2 responses = 0 marks</p> <p>accept any clear indication of responses</p>
		(iv)	2	1	<p>if more than 1 response = 0 marks</p> <p>accept any clear indication of a response</p>
	(c)		<p>decision to have the test or not/ to abort or not (1)</p> <p>impact of decision - lots of people/ parents/ other children will be affected if the baby has cystic fibrosis/ life implications for baby (1)</p>	2	OWTTE
			Total	7	

A221/02

Mark Scheme

June 2012

Question			Answer	Mark	Guidance
3	(a)	(i)	8	1	if more than 1 response = 0 marks accept any clear indication of a response
		(ii)	3	1	if more than 1 response = 0 marks accept any clear indication of a response
		(iii)	5	1	if more than 1 response = 0 marks accept any clear indication of a response
		(iv)	1	1	if more than 1 response = 0 marks accept any clear indication of a response
		(v)	2	1	if more than 1 response = 0 marks accept any clear indication of a response
		(vi)	6	1	if more than 1 response = 0 marks accept any clear indication of a response
	(b)		<i>any five from:</i> first tested on human/animal cells/tissues (1) then tested on animals/ variety of animals (1) then tested on patients/ humans/ people/ volunteers (1) blind/ double blind/ open (label) trials (1) correct explanation of blind/ double blind/ open trial (1) ideas/ details of safety/ testing for side-effects (1) ideas/ details of effectiveness/ how well the vaccine works (1)	5	ignore an individual response if in incorrect order ignore references to unqualified cells ignore references to use of a placebo
			Total	11	

A221/02

Mark Scheme

June 2012

Question			Answer	Mark	Guidance														
4	(a)		mutations	1															
	(b)		<table><tr><td>...in body cells can be...</td><td></td></tr><tr><td>...caused by natural selection</td><td></td></tr><tr><td>...all environmental factors can change...</td><td></td></tr><tr><td>...may produce new characteristics</td><td>✓</td></tr><tr><td>...sexual reproduction changes genes</td><td></td></tr><tr><td>...caused by artificial selection</td><td></td></tr><tr><td>...in sex cells can be passed</td><td>✓</td></tr></table>	...in body cells can be...		...caused by natural selection		...all environmental factors can change...		...may produce new characteristics	✓	...sexual reproduction changes genes		...caused by artificial selection		...in sex cells can be passed	✓	2	if more than 2 responses deduct 1 mark for each additional response accept any clear indication of responses eg. crosses if ticks not shown, shaded boxes
...in body cells can be...																			
...caused by natural selection																			
...all environmental factors can change...																			
...may produce new characteristics	✓																		
...sexual reproduction changes genes																			
...caused by artificial selection																			
...in sex cells can be passed	✓																		
	(c)		environmental change (1) mutations (1) natural selection (1)	3	if more than 3 responses deduct 1 mark for each additional response accept any clear indication of responses eg. ticks, underlined														
			Total	6															

A221/02

Mark Scheme

June 2012

Question		Answer	Mark	Guidance
5	(a)	Variation can be caused by the environment.	3	if more than 3 responses deduct 1 mark for each additional response accept any clear indication of responses eg. crosses if ticks not shown, shaded boxes
		Variation only occurs between organisms of the same species.		
		Variation is caused by natural selection.		
		Genetic variation can be passed from parent to offspring.		
		Environmental variation is passed from parent to offspring.		
		Variation is only caused by selective breeding.		
		Variation does not occur between clones.		
		Variation can be caused by genes.		
	(b)	The transfer of information between different organisms.	2	if more than 2 responses deduct 1 mark for each additional response accept any clear indication of responses eg. crosses if ticks not shown, shaded boxes
		Showing how artificial selection took place.		
		Transferring energy from the Sun into food.		
		The extinction of a species.		
		The future development of food crops.		
		The production of new medicines.		
	(c)	meeting needs of people today/ maintaining biodiversity/ idea of saving species/ named example of a sustainable process eg. replacement planting of trees, selective harvesting of fish, recycling a specific resource (1) for future use / generations (1)	2	OWTTE
	(d)	credit any correct example eg. Dodos	1	reject dinosaurs
Total			8	
Paper Total			42	

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