

Science A

General Certificate of Secondary Education

Unit **A211/01**: Unit 1: Modules B1, C1, P1 (Foundation Tier)

Mark Scheme for January 2013

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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
<u>words</u>	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	credit alternative wording / or words to that effect
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. Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).
- 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.

eg for a one-mark question where ticks in the third and fourth boxes are required for the mark:

<input type="checkbox"/>	<input type="checkbox"/>	<input style="border: 1px solid black; border-radius: 50%;" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input style="border: 1px solid black; border-radius: 50%;" type="checkbox"/>
<input style="border: 1px solid black; border-radius: 50%;" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input style="border: 1px solid black; border-radius: 50%;" type="checkbox"/>	<input style="border: 1px solid black; border-radius: 50%;" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*This would be worth
1 mark.*

*This would be worth
0 marks.*

*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-box questions:
 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 and other markings. If there are no ticks, accept clear, unambiguous indications, eg shading or crosses. Credit should be given according to the instructions given in the guidance column for the question. 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 cities in England:

Edinburgh	<input type="checkbox"/>
Manchester	<input type="checkbox"/>
Paris	<input type="checkbox"/>
Southampton	<input type="checkbox"/>

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:
- i. **Read through the whole answer from start to finish**
 - ii. **Decide the level that best fits** the answer – match the quality of the answer to the closest level descriptor
 - iii. **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.

Question		Answer	Marks	Guidance								
1	(a)	<table border="1"> <thead> <tr> <th>Description</th> <th>Combination</th> </tr> </thead> <tbody> <tr> <td>is a carrier of FRDA</td> <td>Aa</td> </tr> <tr> <td>has not got FRDA and is not a carrier</td> <td>AA</td> </tr> <tr> <td>has FRDA</td> <td>aa</td> </tr> </tbody> </table>	Description	Combination	is a carrier of FRDA	Aa	has not got FRDA and is not a carrier	AA	has FRDA	aa	2	one mark for each correct line
		Description	Combination									
		is a carrier of FRDA	Aa									
		has not got FRDA and is not a carrier	AA									
has FRDA	aa											
(1)												
(1)												
	(b)	A/allele on second chromosome in same position as a on first chromosome (1)	1	some part of allele on second chromosome must be level with some part of allele on first chromosome								
	(c) (i)	<table border="1"> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td>protein</td> <td>✓</td> </tr> </tbody> </table>							protein	✓	1	
protein	✓											
	(ii)	<p>against: wrong to genetically alter mice/organisms / playing God / virus may cause disease/damage cell / may have unexpected side effects / different effects on people than animals (1)</p> <p>for: may cure (FRDA) (1)</p>	2	max of one mark for and one mark against allow cruelty to animals / against animal rights / religious objections / wrong to change DNA / animals have different genes to humans allow helping people/saves people's lives / people get better / get idea of whether it works or not ignore treat FRDA/improve medication / safer to test on animals								

Question			Answer	Marks	Guidance												
1	(c)	(iii)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%; height: 20px;"></td> <td style="width: 20%;"></td> </tr> <tr> <td style="height: 20px;"></td> <td></td> </tr> <tr> <td>...make the missing protein.</td> <td style="text-align: center;">✓ (1)</td> </tr> <tr> <td style="height: 20px;"></td> <td></td> </tr> </table>					...make the missing protein.	✓ (1)			1					
...make the missing protein.	✓ (1)																
		(iv)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%; height: 20px;">...able to develop into any kind of cell.</td> <td style="width: 20%; text-align: center;">✓ (1)</td> </tr> <tr> <td style="height: 20px;"></td> <td></td> </tr> <tr> <td style="height: 20px;"></td> <td></td> </tr> <tr> <td style="height: 20px;"></td> <td></td> </tr> <tr> <td style="height: 20px;"></td> <td></td> </tr> <tr> <td>...unspecialised.</td> <td style="text-align: center;">✓ (1)</td> </tr> </table>	...able to develop into any kind of cell.	✓ (1)									...unspecialised.	✓ (1)	2	
...able to develop into any kind of cell.	✓ (1)																
...unspecialised.	✓ (1)																
	(d)		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Risk</td> <td style="width: 33%;">Reliability</td> <td style="width: 33%;">Ethics</td> </tr> <tr> <td>Katie</td> <td>Tim Vikram</td> <td>Florence Patrick</td> </tr> </table>	Risk	Reliability	Ethics	Katie	Tim Vikram	Florence Patrick	3	<p>all 5 correct = 3 marks 4 correct = 2 marks 2 or 3 correct = 1 mark</p> <p>if the same name appears in more than one box then that name is not given credit.</p> <p>allow any unambiguous indication of choice eg K for Katie</p>						
Risk	Reliability	Ethics															
Katie	Tim Vikram	Florence Patrick															
Total				12													

Question		Answer	Marks	Guidance
2		clones are genetically identical (1) form naturally when cells of an embryo separate (1)	2	allow same DNA / same genetic information ignore reference to twins/chromosomes/same genes/same alleles /same genetics allow <u>fertilised</u> egg splits / embryo splits
Total			2	

Question		Answer	Marks	Guidance																
3	(a) (i)		1	black circle must touch both open circles the open circles must not touch each other allow non linear shape. allow atoms labelled with names or C and O give mark																
	(ii)	(absorbed by) plants/trees (1) for photosynthesis / to make their own food (1) dissolves/reacts with/is absorbed in (1) water/rain water/oceans/sea(s) (1)	2	maximum 2 marks dissolve/react/absorb only allowed if linked to water/rain water/oceans/sea(s)																
	(b) (i)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Statement</th> <th style="width: 15%;">Charlotte</th> <th style="width: 15%;">Jim</th> <th style="width: 15%;">Both of them</th> </tr> </thead> <tbody> <tr> <td>Coal should not...</td> <td></td> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td>...can be trapped.</td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td>...the atmosphere.</td> <td></td> <td></td> <td style="text-align: center;">✓</td> </tr> </tbody> </table>	Statement	Charlotte	Jim	Both of them	Coal should not ...		✓		...can be trapped.	✓			...the atmosphere.			✓	3	mark each row 1 mark for each correct row
Statement	Charlotte	Jim	Both of them																	
Coal should not ...		✓																		
...can be trapped.	✓																			
...the atmosphere.			✓																	
	(ii)	any two from: less fuel burned (1) for same amount of energy (1) less CO ₂ produced (1)	2	allow carbon dioxide trapped in the ground do not allow 'less pollution' alone, CO ₂ should be mentioned for mark																
Total			8																	

Question			Answer	Marks	Guidance
4	(a)	(i)	Silver Street (1)	1	if more than one street indicated, no mark
		(ii)	<p>...is trapped by buildings</p> <div style="display: flex; align-items: center; gap: 10px;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </div>	1	if more than one box ticked, no mark
	(b)		60 – 98 (1)	1	both numbers needed allow 98 – 60
	(c)	(i)	B (1) and D (1)	2	(1) for each correct answer accept either order
		(ii)	E (1)	1	
Total				6	

Question			Answer	Marks	Guidance
5	(a)	(i)	parallax (1)	1	allow answer clearly marked on list above (circle/underline etc.) allow incorrect spelling if answer unambiguous
		(ii)	<p>Star A is further from Earth than B</p> <div style="display: flex; align-items: center; gap: 10px;"> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> </div>	1	accept any clear and unambiguous response more than 1 response = 0 marks
	(b)		radiation (1) light pollution (1) planets (1)	3	correct response must be in appropriate sentence
Total				5	

Question		Answer	Marks	Guidance
6	(a)	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 2px; width: 80px; height: 20px; margin-bottom: 10px;">crust</div> <div style="border: 1px solid black; padding: 2px; width: 100px; height: 20px; margin-bottom: 10px;">mantle</div> </div> <div style="border: 1px solid black; padding: 2px; width: 80px; height: 20px; margin-left: 0;">core</div>	3	<p>one mark for each correct word</p> <p>allow any clear indication of correct response, eg line from box to word in the list below, number in box and corresponding number next to work on list</p>
	(b)	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 40%;">volcanoes</div> <div style="width: 10%; text-align: center;"><input checked="" type="checkbox"/></div> <div style="width: 40%; text-align: center;"><input type="checkbox"/></div> </div> <div style="display: flex; justify-content: space-between; align-items: flex-start; margin-top: 10px;"> <div style="width: 40%;">earthquakes</div> <div style="width: 10%; text-align: center;"><input checked="" type="checkbox"/></div> <div style="width: 40%; text-align: center;"><input type="checkbox"/></div> </div>	2	<p>two correct responses = 2 marks one correct response = 1 mark</p> <p>If more than two responses, each incorrect response cancels out a correct one.</p>
Total			5	

Question		Answer	Marks	Guidance
7		<p>probability of large asteroids colliding with Earth is low (1)</p> <p>plus any three from:</p> <p>Earth is small compared with universe/space (1)</p> <p>consequences very severe (1)</p> <p>local effects, eg shock wave, explosive impact (1)</p> <p>impact in ocean – tsunami (1)</p> <p>impact on land – forest fires, dust clouds, earthquakes, volcanoes, craters (1)</p> <p>global consequences, eg block out Sun (1)</p> <p>idea of (cooler) climate change (1)</p> <p>Idea of extinction (1)</p> <p>risk = probability x consequences (1)</p>	4	
Total			4	

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