

Science A

General Certificate of Secondary Education

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

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

Annotation	Meaning
	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

Annotation	Meaning
	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

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:


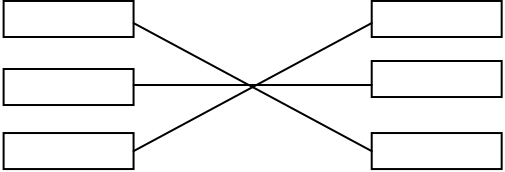
- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

Question		Answer	Marks	Guidance
1	(a)	Proteins Nucleus DNA	2	all correct = 2 marks 2 correct = 1 mark 0 or 1 correct = 0 marks
	(b)	XY	1	
	(c)	<u>Allele(s)</u>	1	
Total			4	

Question		Answer	Marks	Guidance								
2	(a)	<table border="1" style="width: 100%;"> <tr> <td style="width: 80%;">They have different genes.</td> <td style="width: 20%;"></td> </tr> <tr> <td>They have different parents.</td> <td></td> </tr> <tr> <td>They were produced by sexual reproduction.</td> <td></td> </tr> <tr> <td>Their environmental conditions were different.</td> <td style="text-align: center;">✓</td> </tr> </table>	They have different genes.		They have different parents.		They were produced by sexual reproduction.		Their environmental conditions were different.	✓	1	more than 1 tick = 0
They have different genes.												
They have different parents.												
They were produced by sexual reproduction.												
Their environmental conditions were different.	✓											
	(b)	Beatrice;	1									
	(c)	Stem;	1									
Total			3									

Question		Answer	Marks	Guidance
3		<p>factors: (2) quality of life / difficulties a child with CF would face; could they look after a child with CF; Need to consider how it would affect other children/family/quality of (family) life; terminations are wrong/unnatural/against their religion/ unethical/; unborn child has a right to life;</p> <p>actions: (1) whether to have a termination (or not); whether to have any more children:</p>	3	Accept could pass on to child's offspring
Total			3	

Question			Answer	Marks	Guidance								
4	(a)	(i)	Father Hh Mother hh; (1) (Mary) Hh and hh; (1)	2									
		(ii)	50% / 0.5 / 1:1 / 50:50;	1	Allow any clear indication of half, allow "evens"								
	(b)		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Mary's grandmother does not have the disorder.</td> <td style="width: 20%;"></td> </tr> <tr> <td>The symptoms do not show until later in life.</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>The allele for Huntington's disorder is recessive.</td> <td></td> </tr> <tr> <td>Environmental factors might prevent the disorder developing.</td> <td></td> </tr> </table>	Mary's grandmother does not have the disorder.		The symptoms do not show until later in life.	✓	The allele for Huntington's disorder is recessive.		Environmental factors might prevent the disorder developing.		1	more than 1 tick = 0
Mary's grandmother does not have the disorder.													
The symptoms do not show until later in life.	✓												
The allele for Huntington's disorder is recessive.													
Environmental factors might prevent the disorder developing.													
Total				4									

Question			Answer	Marks	Guidance
5	(a)	(i)	buses carry more people than cars; fewer buses than cars / there will be fewer cars less fuel burned/CO ₂ produced per passenger (mile);	3	
		(ii)	Ring around: 	1	ring around any other diagram = 0
	(b)			2	all 3 lines correct = 2 marks 2 or 1 line correct = 1 mark
	(c)	(i)	Chris and Dave	1	both answers correct for 1 mark
		(ii)	Flora	1	
Total				8	

Question			Answer	Marks	Guidance										
6	(a)	(i)	carbon hydrogen	1	both answers correct for 1 mark										
		(ii)	carbon monoxide	1	IF a formula is given, it MUST be correct										
	(b)	(i)	<table border="1"> <tr> <td>As the distance from the motorway increases, the concentration of carbon particulates increase.</td> <td><input type="checkbox"/></td> </tr> <tr> <td>The nearer the measurements are to the motorway, the fewer the carbon particulates.</td> <td><input type="checkbox"/></td> </tr> <tr> <td>The concentration of carbon particulates decreases by $2\mu\text{g}/\text{m}^3$ every 20m from the motorway.</td> <td><input type="checkbox"/></td> </tr> <tr> <td>The further the measurements are from the motorway, the smaller the concentration of carbon particulates.</td> <td><input checked="" type="checkbox"/></td> </tr> </table>	As the distance from the motorway increases, the concentration of carbon particulates increase.	<input type="checkbox"/>	The nearer the measurements are to the motorway, the fewer the carbon particulates.	<input type="checkbox"/>	The concentration of carbon particulates decreases by $2\mu\text{g}/\text{m}^3$ every 20m from the motorway.	<input type="checkbox"/>	The further the measurements are from the motorway, the smaller the concentration of carbon particulates.	<input checked="" type="checkbox"/>	1	tick in any other box = 0		
As the distance from the motorway increases, the concentration of carbon particulates increase.	<input type="checkbox"/>														
The nearer the measurements are to the motorway, the fewer the carbon particulates.	<input type="checkbox"/>														
The concentration of carbon particulates decreases by $2\mu\text{g}/\text{m}^3$ every 20m from the motorway.	<input type="checkbox"/>														
The further the measurements are from the motorway, the smaller the concentration of carbon particulates.	<input checked="" type="checkbox"/>														
		(ii)	<table border="1"> <tr> <td>There is no data on the number of vehicles on the motorway.</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Jack has taken the wrong measurements.</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Jack has not calculated the true value of carbon particulate concentration.</td> <td><input type="checkbox"/></td> </tr> <tr> <td>The carbon particulates may not have come from the motorway traffic.</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Other air pollutants were not measured.</td> <td><input type="checkbox"/></td> </tr> </table>	There is no data on the number of vehicles on the motorway.	<input type="checkbox"/>	Jack has taken the wrong measurements.	<input type="checkbox"/>	Jack has not calculated the true value of carbon particulate concentration.	<input type="checkbox"/>	The carbon particulates may not have come from the motorway traffic.	<input checked="" type="checkbox"/>	Other air pollutants were not measured.	<input type="checkbox"/>	1	tick in any other box = 0
There is no data on the number of vehicles on the motorway.	<input type="checkbox"/>														
Jack has taken the wrong measurements.	<input type="checkbox"/>														
Jack has not calculated the true value of carbon particulate concentration.	<input type="checkbox"/>														
The carbon particulates may not have come from the motorway traffic.	<input checked="" type="checkbox"/>														
Other air pollutants were not measured.	<input type="checkbox"/>														
		(iii)	<p>Weather condition AND effect on amount of pollution/particulates (1);</p> <p>Explanation of the mechanism by which this weather condition changes the amount of particulates in his results (1);</p>	2	<p>do not allow sunny / cloudy</p> <p>“affect” is a repeat of the question stem and is not enough</p> <p>allow wind blows pollution in from NAMED source</p>										
			Total	6											

Question		Answer	Marks	Guidance								
7	(a)	<table border="1"> <tr> <td>only Dr Adams</td> <td>✓</td> </tr> <tr> <td>only Dr Baker</td> <td></td> </tr> <tr> <td>both scientists</td> <td></td> </tr> <tr> <td>neither scientist</td> <td></td> </tr> </table>	only Dr Adams	✓	only Dr Baker		both scientists		neither scientist		1	tick in any other box = 0
only Dr Adams	✓											
only Dr Baker												
both scientists												
neither scientist												
	(b)	<table border="1"> <tr> <td>only Dr Adams</td> <td></td> </tr> <tr> <td>only Dr Baker</td> <td></td> </tr> <tr> <td>both scientists</td> <td>✓</td> </tr> <tr> <td>neither scientist</td> <td></td> </tr> </table>	only Dr Adams		only Dr Baker		both scientists	✓	neither scientist		1	tick in any other box = 0
only Dr Adams												
only Dr Baker												
both scientists	✓											
neither scientist												
	(c)	<table border="1"> <tr> <td>only Dr Adams</td> <td></td> </tr> <tr> <td>only Dr Baker</td> <td></td> </tr> <tr> <td>both scientists</td> <td>✓</td> </tr> <tr> <td>neither scientist</td> <td></td> </tr> </table>	only Dr Adams		only Dr Baker		both scientists	✓	neither scientist		1	tick in any other box = 0
only Dr Adams												
only Dr Baker												
both scientists	✓											
neither scientist												
	(d)	<table border="1"> <tr> <td>The explanations are probably wrong.</td> <td></td> </tr> <tr> <td>Dr Adams has proved that Dr Baker is wrong.</td> <td></td> </tr> <tr> <td>Dr Baker has proved that Dr Adams is wrong.</td> <td></td> </tr> <tr> <td>The scientists have different interpretations of the data.</td> <td>✓</td> </tr> </table>	The explanations are probably wrong.		Dr Adams has proved that Dr Baker is wrong.		Dr Baker has proved that Dr Adams is wrong.		The scientists have different interpretations of the data.	✓	1	tick in any other box = 0
The explanations are probably wrong.												
Dr Adams has proved that Dr Baker is wrong.												
Dr Baker has proved that Dr Adams is wrong.												
The scientists have different interpretations of the data.	✓											
Total			4									

Question		Answer	Marks	Guidance								
8	(a)	<table border="1"> <tr> <td>XYZ</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>YXZ</td> <td><input type="checkbox"/></td> </tr> <tr> <td>YZX</td> <td><input type="checkbox"/></td> </tr> <tr> <td>ZXY</td> <td><input type="checkbox"/></td> </tr> </table>	XYZ	<input checked="" type="checkbox"/>	YXZ	<input type="checkbox"/>	YZX	<input type="checkbox"/>	ZXY	<input type="checkbox"/>	1	tick in any other box = 0
XYZ	<input checked="" type="checkbox"/>											
YXZ	<input type="checkbox"/>											
YZX	<input type="checkbox"/>											
ZXY	<input type="checkbox"/>											
	(b)	<table border="1"> <tr> <td>The layers were formed by sedimentation.</td> <td><input type="checkbox"/></td> </tr> <tr> <td>The layers were only formed during the past few years.</td> <td><input type="checkbox"/></td> </tr> <tr> <td>The cliff contains very old rocks.</td> <td><input type="checkbox"/></td> </tr> <tr> <td>The sea has eroded some of the land.</td> <td><input checked="" type="checkbox"/></td> </tr> </table>	The layers were formed by sedimentation.	<input type="checkbox"/>	The layers were only formed during the past few years.	<input type="checkbox"/>	The cliff contains very old rocks.	<input type="checkbox"/>	The sea has eroded some of the land.	<input checked="" type="checkbox"/>	1	tick in any other box = 0
The layers were formed by sedimentation.	<input type="checkbox"/>											
The layers were only formed during the past few years.	<input type="checkbox"/>											
The cliff contains very old rocks.	<input type="checkbox"/>											
The sea has eroded some of the land.	<input checked="" type="checkbox"/>											
	(c)	A D C (B)	2	A anywhere before D (1); D anywhere before C (1)								
Total			4									

Question		Answer	Marks	Guidance
9		<p>Reasons for lack of acceptance include</p> <p>Wegener was an outsider / (only) a meteorologist / not a geologist / was a foreigner (1);</p> <p>continental movement not observable (1);</p> <p>no known mechanism for movement (1);</p> <p>other explanations/theories for the evidence (1)</p>	2	<p>any two points</p> <p>“not enough evidence/proof” is not worth a mark</p> <p>didn't think/believe continents were moving</p> <p>needs more detail</p> <p>accept “land bridges” idea</p> <p>reject ‘Wegener was not a scientist’</p>
Total			2	

Question		Answer	Marks	Guidance
10		Cloud of gases and/or dust (1); Collapsed/condensed (under gravity) to form Sun, planets, etc (1)	2	Ignore "big bang / explosion" type mechanisms
Total			2	

Question		Answer	Marks	Guidance															
11		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 20%;">Astronomical Object</th> <th style="width: 10%;"></th> <th style="width: 70%;">Description</th> </tr> </thead> <tbody> <tr> <td>comet</td> <td style="text-align: center;">/</td> <td>a star</td> </tr> <tr> <td>galaxy</td> <td style="text-align: center;">/</td> <td>contains thousands of millions of stars</td> </tr> <tr> <td>moon</td> <td style="text-align: center;">/</td> <td>has a long, thin elliptical orbit</td> </tr> <tr> <td>Sun</td> <td style="text-align: center;">/</td> <td>moves around a planet</td> </tr> </tbody> </table>	Astronomical Object		Description	comet	/	a star	galaxy	/	contains thousands of millions of stars	moon	/	has a long, thin elliptical orbit	Sun	/	moves around a planet	2	all lines correct = (2); one or two lines correct = (1)
Astronomical Object		Description																	
comet	/	a star																	
galaxy	/	contains thousands of millions of stars																	
moon	/	has a long, thin elliptical orbit																	
Sun	/	moves around a planet																	
Total			2																

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