

Mark Scheme for June 2011

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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

Subject-specific Marking Instructions

- Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).
- 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 the third and fourth boxes are required for the mark:

✗
✗

*This would be worth
1 mark.*

✓
✗

*This would be worth
0 marks.*

✗
✗
✓
✓

*This would be worth
1 mark.*

- 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.

e. 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, e.g. 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.

e.g. 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

MARK SCHEME:

Question		Answer	Mark	Guidance								
1	a	<table border="1"> <thead> <tr> <th>description</th> <th>combination</th> </tr> </thead> <tbody> <tr> <td>has FRDA</td> <td>aa</td> </tr> <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> </tbody> </table>	description	combination	has FRDA	aa	is a carrier of FRDA	Aa	has not got FRDA and is not a carrier	AA	2	one mark for each correct line
description	combination											
has FRDA	aa											
is a carrier of FRDA	Aa											
has not got FRDA and is not a carrier	AA											
	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	<p>l</p> <p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> protein <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </p>	1									
1	c	<p>li</p> <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 ignore treat FRDA/improve medication/safer to test on animals								

Question			Answer	Mark	Guidance						
1	c	lii	<p>make the missing protein</p> <p><input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	1							
		iv	<p>... unspecialised.</p> <p><input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>... can develop into any kind of cell.</p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	2							
	d		<table border="1"> <thead> <tr> <th>risk</th> <th>reliability</th> <th>ethics</th> </tr> </thead> <tbody> <tr> <td>Elaine</td> <td>Richard Sanjay</td> <td>Greta Barry</td> </tr> </tbody> </table>	risk	reliability	ethics	Elaine	Richard Sanjay	Greta Barry	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 e.g. E for Elaine</p>
risk	reliability	ethics									
Elaine	Richard Sanjay	Greta Barry									
Total				12							

Question		Answer	Mark	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 genetics allow <u>fertilised</u> egg splits/embryo splits
Total			2	
3	a	i oxygen (1)	1	
		ii carbon dioxide (1)	1	
		iii carbon dioxide (1) sulfur dioxide (1)	2	1 mark for each correct answer in either order
	b	 (1)	1	allow circles labelled C and O instead of shading carbon must touch both oxygens, oxygens must not touch each other circles need not be linear if any other different molecule drawn = 0 marks if two or more CO ₂ molecules drawn ignore extra molecule(s)
Total			5	
4	a	carbon monoxide poisonous / toxic / forms smog (1) nitrogen oxides poisonous / toxic / breathing difficulties / form smog / form acid rain / damage ozone layer (1)	2	ignore references to global warming / Greenhouse gases/harmful/can kill you allow description of toxicity e.g. effect on blood not breathing difficulties / dirty buildings not dirty buildings allow they are toxic / poisonous / form smog for 2 marks allow they form acid rain / cause breathing difficulties / damage ozone layer for 1 mark
	b	more people on a bus (1) less (pollution) per person/fewer cars (1)	2	ignore: more people use buses/buses carry more people allow people use bus instead of car
Total			4	

Question		Answer	Mark	Guidance
5	a	10 to 120 (1)	1	allow 120 to 10
	b	i Josh (1) Rajid (1)	2	1 mark for each correct answer in either order
		ii Rajid (1)	1	
		iii Sara (1)	1	
Total			5	

6	a	1 (1) 5 (1)	2	either order
	b	5 (1)	1	
Total			3	

7	a	Dr Adams <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1	
	b	<input type="checkbox"/> <input type="checkbox"/> both scientists <input checked="" type="checkbox"/> (1) <input type="checkbox"/>	1	

Question		Answer	Mark	Guidance
7	c	<input type="checkbox"/> <input type="checkbox"/> both scientists <input checked="" type="checkbox"/> (1) <input type="checkbox"/>	1	
	d	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> neither scientist <input checked="" type="checkbox"/> (1)	1	
Total			4	

Question		Answer	Mark	Guidance
8	a	<input type="checkbox"/> <input type="checkbox"/> ... not enough evidence to support ... <input checked="" type="checkbox"/> (1) <input type="checkbox"/>	1	
	b	<input type="checkbox"/> earthquakes <input checked="" type="checkbox"/> (1) <input type="checkbox"/> volcanoes <input checked="" type="checkbox"/> (1) <input type="checkbox"/>	2	
		Total	3	

Question		Answer				Mark	Guidance
9						4	4 Marks two factors for two of asteroids, stars and galaxies plus one for the remaining one 3 Marks two factors for one of asteroids, stars and galaxies plus one for the remaining two 2 Marks one factor for each of asteroids, stars and galaxies 1 Mark one factor for two of asteroids, stars and galaxies
		factors	stars	galaxies	asteroids		
		where?	in galaxies / outside Solar System / very far away	very far away / outside Milky Way	in Solar System / between Mars and Jupiter		
		how big? *	smaller than galaxies / bigger than asteroids	bigger than stars / bigger than asteroids	smaller than galaxies/ stars		
		around Sun?	don't orbit around the Sun	don't orbit around the Sun / moving away (from the Sun)	orbit the Sun		
made from?	(hot) gases	made from many stars	rock/dust/ rubble				
		* 'How big?' must be a sensible comparison with some other body (but not the Universe) Note. Unless statements are made about all 3 bodies then only one mark can be awarded.					
		Total				4	

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