



GCSE

Science A

General Certificate of Secondary Education

Unit **A213/02**: Modules B3, C3, P3 (Higher Tier)

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.

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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

- 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:

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


<input type="checkbox"/>

*This would be worth
1 mark.*

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


<input type="checkbox"/>

*This would be worth
0 marks.*



<input type="checkbox"/>

<input type="checkbox"/>

*This would be worth
1 mark.*

d. 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	✓	✗	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	✗		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

MARK SCHEME:

Question		Answer		Mark	Guidance
1	a	C D B A		1	
	b	i	Alan <u>and</u> Dave (1)	1	both needed
		ii	Alan (1)	1	
		Total		[3]	

2	a		bar to correct place ($42\% \pm 1\%$) (1)	1	accept within half a division either side of the 42 line
	b	i	15 % (1)	1	
		ii	food and drink (1)	1	
	c		any three from: what the risk is and to whom; what the benefit is and to whom; ALARA principle; official (Health & Safety) regulations must be kept/details of implementation in the workplace;	3	risk: exposed to radiation; could be contaminated; damage to cells/cancer; dose may be excessive; produces hazardous waste; ignore 'it could harm/kill you' – needs more detail benefit: provides employment; good pay; specified advantage of nuclear power (e.g. no CO ₂ output, high power, efficient); ALARA = As Low As Reasonably Achievable (i.e. minimise risk within constraints of being able to run the nuclear industry) implementing regulation: e.g. protective clothing; badges to monitor dose; time in dangerous situations limited; health checks;
		Total		[6]	

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Question			Answer	Mark	Guidance
3	a		A = gamma B = alpha C = beta	1	all three correct for one mark allow correct symbols
	b	i	nucleus (1)	2	allow nuclear and nuclei not neutron, nuc, nuclide
		ii	proton <u>and</u> neutron (1)	1	either order allow 'nuetron' or other phonetically correct words
	c		12 minutes = 4 half-lives / showing 400 → 200 → 100 → 50 → 25 (1) so final count = 25 / s (1)	2	e.g. 12/3 = 4 gets this mark 1 mark for correct method (e.g. repeated halving) e.g. 400 → 200 → 100 gets this mark 25 will get 2 marks even if no working shown
			Total	[5]	

4	a	i	herring (1)	1	
		ii	competition (1)	1	allow 'competing' or 'compete', etc
	b		<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="flex: 1;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">increase</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">decrease</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">stay the same</div> </div> <div style="flex: 1; text-align: right;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">cod don't eat ..</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">fewer sand eels</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">more sand eels</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">grey seals ...</div> </div> </div>	1	there must be just the one correct line to get this mark if there are any other lines present, they must be crossed out or this gets no marks
			Total	[3]	

Question		Answer	Mark	Guidance
5		<p>any three from:</p> <p>variation not all the males have the same size tails / same number eyespots;</p> <p>competition males compete for mates / females prefer males with bigger tails/more eyespots;</p> <p>reproduction (selected) males are more likely to reproduce;</p> <p>evolutionary consequence passing on genes for bigger tails (so tail size increases over time);</p>	3	<p>allow reverse arguments</p> <p>'females prefer to mate with males with most eyespots' is a quote but gets points 1 & 2</p> <p>N.B. 'males with bigger tails/more eyespots are more likely to reproduce' = 2 marks (marking points 1 & 3)</p>
Total		[3]		

6	a	2, 4, 5, 6 (1)	1	any order
	b	biodiversity (1)	1	
Total		[2]		

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Question		Answer	Mark	Guidance										
8	a	nervous and hormonal/endocrine (1)	1	either order allow 'nerves' or 'neurons' for 'nervous' accept central nervous system (or peripheral nervous system)										
	b	<p>way of working</p> <table> <tr> <td>uses electrical impulses</td> <td>features</td> </tr> <tr> <td></td> <td>short lived</td> </tr> <tr> <td></td> <td>slow</td> </tr> <tr> <td></td> <td>rapid</td> </tr> <tr> <td>uses chemicals transported in blood</td> <td>long-lasting</td> </tr> </table>	uses electrical impulses	features		short lived		slow		rapid	uses chemicals transported in blood	long-lasting	2	all 4 correct = 2 marks 2 or 3 correct = 1 mark
uses electrical impulses	features													
	short lived													
	slow													
	rapid													
uses chemicals transported in blood	long-lasting													
Total		[3]												

Question		Answer	Mark	Guidance
9	a	any two from: law says preservatives should be shown; SO ₂ /preservative may harm consumers; people do not know SO ₂ /preservative is in product; removal of product removes potential harm;	2	eg goes against the regulations not to say it's there reject confusion with sell-by date; 'may go off' does not get this mark 'label is misleading' is enough for this mark
	b	... stops the growth of fungi and bacteria <input checked="" type="checkbox"/> (1)	1	tick in any other box = 0 marks
Total		[3]		

Question		Answer	Mark	Guidance	
10	a	<p>... safe levels of chemicals in food</p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>They advise people on what they ... eat</p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	2	1 mark for each correct answer if 3 ticks deduct 1 mark 4 or 5 ticks = 0 marks	
	b	i	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>...25g fat, and no salt</p> <p><input checked="" type="checkbox"/> (1)</p>	1	tick in any other box = 0 marks
		ii	<p>Martha's diet: fat/sugar content of food she eats/recommended daily allowances of fat/sugar(1)</p> <p>Health consequences (of too much fat and sugar): (1)</p>	2	<p>ignore reference to salt or other dietary constituents must mention fat or sugar</p> <p>named condition e.g. diabetes, obesity, heart disease/ dependence on age/gender/genetic predisposition using other means to find risk, e.g. doctor, internet</p>
	c		<p>carbon; hydrogen; oxygen; nitrogen;</p>	2	<p>answers in any order accept chemical symbols C, H, O, N all 4 correct = 2 marks 3/2 correct = 1 mark</p>
			Total	[7]	

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Question		Answer	Mark	Guidance
11		E (1) A (1) E (1) B (1)	4	accept lower case letters a, b, c, d, e
		Total	[4]	

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