

Additional Science A

General Certificate of Secondary Education

Unit **A216/02**: Modules B5, C5, P5 (Higher 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.

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

*This would be worth
1 mark.*

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

*This would be worth
0 marks.*

<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-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

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
<p>1 (a)</p>	<p><u>Where is the salt?</u> Idea of rocks/mountain/ground/lithosphere contain the salt or salts or minerals;</p> <p><u>How does (the salt) get into the water?</u> describes <u>extraction</u> of material <u>from</u> rocks by water eg salt dissolves/chemicals washed out of rocks;</p> <p><u>What happens to the sea?</u> links evaporation to water OR evaporation to salt left behind / salt doesn't evaporate ;</p>	<p>3</p>	<p>chemicals not enough for the salt marking point</p> <p>must strongly infer that the salt is in the ground to start with. if ground not mentioned, allow any mention of salt in streams/rivers – assume from ground unless candidate contradicts that assumption. allow rivers pick up salt = salt in ground. allow the water flows over salty ground / rains onto cliffs and picks up salts not salt travels down rivers / rain picks up salt</p> <p>the extraction must be discussed the second marking point will often include the first, and be worth two marks salt washed out of rocks = 2 chemicals washed out of rocks = 1</p> <p>any context must imply that water evaporates FROM the sea. ignore 'sea evaporates'</p>
<p>(b)</p>	<p>Water is made of...</p> <p>...small molecules. <input type="checkbox"/></p> <p style="text-align: center;">✓</p> <p>The forces between water particles are...</p> <p>...weak forces of attraction <input type="checkbox"/></p> <p style="text-align: center;">✓</p>	<p>2</p>	<p>mark each column separately</p>

Question		Answer	Marks	Guidance
	(c)	CH ₄ ;	1	
Total			6	

Question		Answer	Marks	Guidance
2	(a)	E;	1	
	(b)	D;	1	
	(c)	A;	1	
	(d)	B;	1	
Total			4	

Question		Answer	Marks	Guidance
3	(a)	(electrolyte) is ionic/contains ions/charged particles; (ions) move towards the electrodes; lead ions or positive ions to cathode OR bromide ions or negative ions to anode;	3	particles <u>become</u> charged = CON reject electrons/atoms/molecules/neutrons for first marking point only but allow 'protons' ignore incorrect directions ie 'positive particles to anode' do not allow lead goes to cathode do not allow bromine ignore +ve ions go to -ve ions AND -ve ions go to +ve ions
	(b)	160	1	
Total			4	

Question		Answer	Marks	Guidance
4	(a)	0.06W;	1	
	(b)	Charge; Temperature;	2	
	(c)	C;	1	
Total			4	

Question		Answer	Marks	Guidance								
5	(a)	<table border="1" style="width: 100%;"> <tr> <td>All three resistors have the same current</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Resistor A</td> <td></td> </tr> <tr> <td>Resistor B</td> <td></td> </tr> <tr> <td>Resistor C</td> <td></td> </tr> </table>	All three resistors have the same current	✓	Resistor A		Resistor B		Resistor C		1	
All three resistors have the same current	✓											
Resistor A												
Resistor B												
Resistor C												
	(b)	<p>electrons move (atoms don't);</p> <p>(electrons) collide with atoms (in the resistor);</p> <p>energy transferred FROM (electrons to atoms)</p> <p>OR</p> <p>MAKES atoms (only) vibrate OWTTE;</p>	3	<p>ignore reference to current</p> <p>ignore 'electrons and atoms collide'</p>								
	(c)	12 W	1									
Total			5									

Question		Answer	Marks	Guidance
6	(a)	X in both left hand boxes Y in both right hand boxes	2	All 4 boxes correct = 2 2 or 3 boxes correct = 1
	(b)	C;	1	
	(c)	36V;	1	
	(d)	0V;	1	
Total			5	

Question		Answer	Marks	Guidance
7	(a)	C ;	1	if no answer given, check the table
	(b)	Meiosis; idea that (gametes have) 39 chromosomes/haploid/half the chromosomes ; links (gamete fusion) to zygote/embryo OR (gametes fuse) to give full number/diploid/double the number of chromosomes / (returns to)78 chromosomes;	3	accept mis-spelling of meiosis (ie but not if a 'T' is present) accept 'reduction division' instead of meiosis NB unless stated otherwise, assume that the candidate is referring to gametes as the product of cell division allow 'half the genetic information' ignore 'cells/chromosomes split in half' ignore 'gametes double the number of chromosomes' ignore 'half the chromosomes from each parent' in the context of this marking point ignore twice as many chromosomes are produced when the gamete forms reject 78 + 78 chromosomes = 156 (no ecf applied) NB references to fusing and to halving must be in the correct context.
Total			4	

Question		Answer	Marks	Guidance				
8	(a)	<table border="1"> <tr> <td>T</td> <td>35</td> </tr> <tr> <td>G</td> <td>15</td> </tr> </table>	T	35	G	15	1	
T	35							
G	15							
	(b) (i)	amino acids;	1					
	(ii)	<p>Proteins are made in the cytoplasm.</p> <p style="text-align: right;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> </p> <p>A copy of the gene moves from...</p>	2					
Total			4					

Question		Answer	Marks	Guidance
9	(a)	meristems; auxins; clones;	3	must be in correct order ' <u>M</u>ice <u>A</u>nd <u>C</u>heese'
Total			3	

Question		Answer	Marks	Guidance
10		<p>Up to the eight cell stage... <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p>Specialised cells can... <input checked="" type="checkbox"/></p> <p>Both embryonic and adult... <input checked="" type="checkbox"/></p> <p>Some genes in the nucleus... <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p>	3	<p>4 correct (3)</p> <p>3 correct (2)</p> <p>2 correct (1)</p> <p>0 or 1 correct (0)</p> <p>If more than 4 ticks Each extra tick negates a correct tick</p>
		Total	3	

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