



GCSE

Additional Science A

General Certificate of Secondary Education

Unit A152/01: Modules B5, C5, P5 (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
	no benefit of doubt

<input type="checkbox"/> R	reject
	correct response
<input type="checkbox"/> L1 , <input type="checkbox"/> L2 , <input type="checkbox"/> L3	indicate level awarded for a question marked by level of response
<input type="checkbox"/> A	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).
- 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.

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	✓	✗	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	✗		✓		✓	✓		✓	
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

- 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:

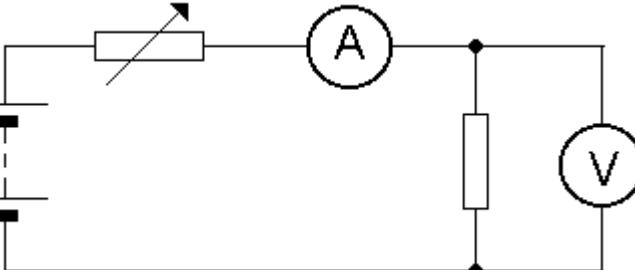
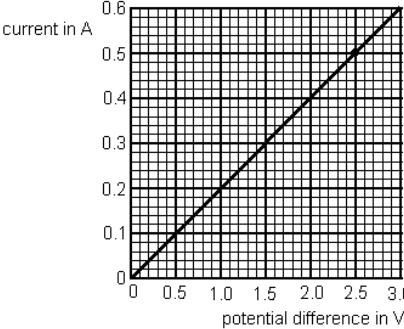
- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

Question		Answer	Marks	Guidance
1	(a)	CO_2 (1) H_2O (1)	2	subscripts by eye
	(b)	<p>Silicon dioxide is present in ... Earth's crust</p> <p>Silicon dioxide has a high melting point</p> <p>All minerals are made of silicon dioxide</p> <p>Silicon dioxide is only found in Iceland</p>	1	
	(c) (i)	<p>340,000 (tonnes) (2)</p> <p>(compares with) 150,000 / use 190,000 (more) (1)</p>	3	if 340,000 tonnes not given, look for $17,000 \times 20$ for 1 mark ignore "it is true"

Question		Answer	Marks	Guidance
1	(c) (ii)	<p>[Level 3] (5–6 marks) Candidate identifies more than one of the issues and gives a plausible rationale to explain at least two of them. Quality of written communication does not impede communication of the science at this level.</p> <p>[Level 2] (3–4 marks) Candidate identifies at least one issue and offers an explanation for it, possibly superficial. Quality of written communication partially impedes communication of the science at this level.</p> <p>[Level 1] (1–2 marks) Candidate identifies issues and makes links to accuracy. Quality of written communication impedes communication of the science at this level.</p> <p>[Level 0] (0 marks) Insufficient or irrelevant science. Answer not worthy of credit.</p>	6	<p>This question is targeted at grades up to E</p> <p>Indicative scientific points may include:</p> <p>NB There is no 'right' answer to the 'most accurate' part.</p> <p>qualifying terms in the text that are issues : 'think', 'about', 'on average'</p> <p>Relevant points include</p> <ul style="list-style-type: none"> • difficulty of estimating output of volcano BECAUSE it is too dangerous • difficulty of estimating output of volcano BECAUSE CO₂ is already in the air • 17,000 appears to be a rounded number BECAUSE it varies from day to day • 17,000 appears to be a rounded number BECAUSE only flights from major airports/filed with air traffic control centres will have been counted • amount of carbon dioxide produced per flight varies BECAUSE of factors such as <ul style="list-style-type: none"> – size/mass of plane – distance of flight – how modern the plane is. • trustworthiness of some internet sites BECAUSE lies are told on the internet. <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>

Question		Answer	Marks	Guidance
1	(d)	any two from: oxygen (also present in reactants) identified ; oxygen now included in products / oxygen ALSO reacts/is added ; atoms conserved ;	2	ignore responses that list several chemicals, do not credit answers with oxygen in the wrong context eg as a product
	(e)	Idea of multiple bonds (1) mentions giant structure / lattice [of any type] / large number of bonds Idea of difficult of breaking the structure (1) covalent / strong / difficult to break	2	ignore tightly packed accept a reference to diamond for first marking point. Any mention of ions/ionic means that only the first marking point is available. "it is a strong ionic structure" = 0 ie both the same marking point "it is an ionic lattice/giant structure" = 1 "It is a covalent lattice/ giant structure" = 2
		Total	16	

Question		Answer	Marks	Guidance
2	(a)	electrolysis	1	
	(b)	better than (1) the negative electrode (1) oxygen gas is formed (1)	3	
		Total	4	

Question		Answer	Marks	Guidance
3	(a)		2	one mark for each allow swapped round for (1) accept a and v instead of A or V
	(b) (i)		1	look for straight line through origin and marked point
	(ii)	calculation of resistance as 5.0Ω (1) not same as 4.7Ω (1)	2	accept about the same value accept any valid comment from incorrectly calculated answer
	(c) (i)	any one of the following: <ul style="list-style-type: none"> • meter readings incorrect • meter readings not precise enough • change of environment eg temperature • change of/different equipment • meters may not be accurate enough. • Named human error 	1	accept explicit experimental errors eg resistor still warm, circuit wired up wrongly, different equipment, but treat generic "experimental errors/did it differently" type comments as neutral do not credit outlier (it is the same resistor) accept "read meter wrongly", "calculated wrongly"

Question		Answer	Marks	Guidance
3	(c) (ii)	make more measurements (1) average them (1)	2	
		Total	8	

Question		Answer	Marks	Guidance								
4		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>The coil...</td><td>...the coil of wire</td></tr> <tr><td>The magnet...</td><td>...a steady magnetic</td></tr> <tr><td>The commutator...</td><td>...the current as the coil</td></tr> <tr><td>The current...</td><td>...as the field pushes</td></tr> </table>	The coil...	...the coil of wire	The magnet...	...a steady magnetic	The commutator...	...the current as the coil	The current...	...as the field pushes	3	correct pattern for (3) one or two mistake for (2) three mistakes for (1)
The coil...	...the coil of wire											
The magnet...	...a steady magnetic											
The commutator...	...the current as the coil											
The current...	...as the field pushes											
		Total	3									

Question		Answer	Marks	Guidance
5	(a)	920 W (1)	1	
	(b)	<p>either current ($= 6 \times 0.5$) = 3.0 A or power ($= 6 \times 230 \times 0.5$) = 690 W then less than maximum, so OK</p>	2	accept valid conclusion from incorrect calculation, e.g. 0.5 A < 4 A
		Total	3	

Question		Answer	Marks	Guidance
6		<p>[Level 3] (5–6 marks) Discusses charge transfer, though with some errors, and goes on to correctly explain one of the effects. Quality of written communication does not impede communication of the science at this level.</p> <p>[Level 2] (3–4 marks) Correctly explains one of the effects in an electrical context, or discusses charge transfer, possibly incorrectly OR discusses charge transfer and gives a very poor explanation of one of the electrical phenomena. Quality of written communication partly impedes communication of the science at this level.</p> <p>[Level 1] (1–2 marks) Realises that it is a charge phenomenon or attempts to explain an electrical phenomenon. Quality of written communication impedes communication of the science at this level.</p> <p>[Level 0] (0 marks) Insufficient or irrelevant science. Answer not worthy of credit.</p>	6	<p>This question is targeted at grades up to C</p> <p>Indicative scientific points may include:</p> <p>Charge transfer</p> <ul style="list-style-type: none"> friction/rubbing transfers electrons between materials electrons have negative charge atoms which lose electrons have positive charge atoms which gain electrons have negative charge balloon and hair must/can be insulators so that electrons can't flow easily through them <p>Hair sticks to balloon</p> <ul style="list-style-type: none"> balloon and hair have opposite charge so attract (and stick to each other) <p>Hair stands on end</p> <ul style="list-style-type: none"> hairs have the same charge so repel each other (and stand on end) <p>Hair slowly goes down</p> <ul style="list-style-type: none"> hairs lose their charge slowly [ignore charge runs out] hair must be a conductor <p>ignore static energy accept static for charge at level 1 and 2</p> <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>
		Total	6	

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Mark Scheme

January 2013

Question		Answer	Marks	Guidance
7	(a)	double four order	2	3 correct = 2 marks 2 correct = 1 mark 1 or 0 correct = 0 marks
	(b)	bases carbohydrates fats proteins	1	
	(c)	nucleus (1) cytoplasm (1)	2	responses must be in this order
		Total	5	

Question		Answer	Marks	Guidance
8	(a)	unspecialised all some	2	3 correct = 2 marks 2 correct = 1 mark 1 or 0 correct = 0 marks
	(b)	Tom (1) nothing is risk free / 100% safe (1)	2	treat as independent marking points
	(c)	Any argument that shows that this one case is not representative (no) because a single case does not provide good evidence for or against a correlation	1	result may not be representative / may be outweighed by a large number of positives / might be an outlier accept "there is only one result" / "not enough evidence" / that animal was sick ignore differences between animals and humans
		Total	5	

Question		Answer	Marks	Guidance
9	(a)	points correctly plotted (1) curved line of best fit (1)	2	
	(b)	the stem is not growing in the first week (1) but the root is growing / OVERALL the plant is growing (1)	2	“Plant is not growing” is in the question, it needs “the STEM not growing” idea eg “it was 15 in the first 2 weeks” Needs OVERALL idea otherwise the question makes no sense.
		Total	4	

Question		Answer	Marks	Guidance
10		<p>Level 3 (5–6 marks) Explains why sperm only needs half a set of chromosomes but skin needs full set, and uses mitosis, meiosis correctly eg sperm count has to complement egg chromosome number. Quality of written communication does not impede communication of the science at this level.</p> <p>Level 2 (3–4 marks) Identifies chromosomes numbers (or ratio of “half”) for both OR correct explanation involving one cell only. Quality of written communication partially impedes communication of the science at this level.</p> <p>Level 1 (1–2 marks) Links cells’ role to question OR makes a relevant comment about either cell. Quality of written communication impedes communication of the science at this level.</p> <p>Level 0 (0 marks) Insufficient or irrelevant science. Answer not worthy of credit.</p>	6	<p>This question is targeted at grades up to D</p> <p>Relevant points include:</p> <ul style="list-style-type: none"> • skin cells form by mitosis • mitosis produces two cells with the same number of chromosomes as the parent cell • sperm cells form by meiosis • meiosis produces cells with half the number of chromosomes of parent cell • sperm cells need to have half number of chromosomes to join with half from egg cell to make new individual with full set. <p>accept 46 chromosomes or 23 pairs for full chromosome number accept 23 chromosomes for sperm</p> <p>reject 46 or 23 pairs of chromosomes in sperm cells</p> <p>Accept role of cell division for skin cells is to make a clone/identical Accept role of cell division for sperm cells is to join with an egg cell (AW baby get other half from mother idea)</p> <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>
		Total	6	

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