

Additional Science A

General Certificate of Secondary Education

Unit **A218/02**: Ideas in Context (Higher Tier)

Mark Scheme for June 2012

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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

- 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.

eg 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.*

- 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, eg 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, eg 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.

eg if a question requires candidates to identify cities in England:

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:
- 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.

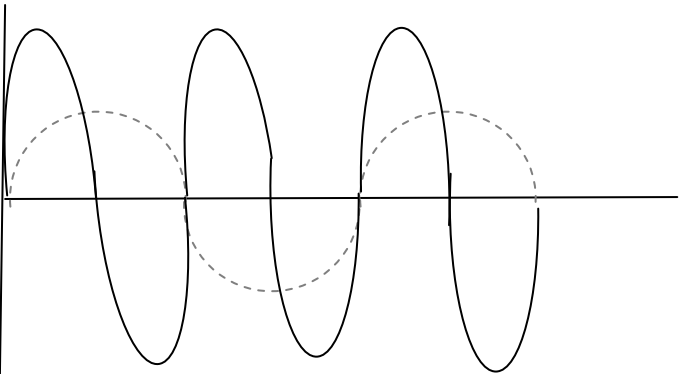
Question		Answer	Marks	Guidance
	(iii)	reversal of a change; (1) to a normal or body temperature / to a stable state; (1)	2	accept AW for reverse eg antagonistic response accept AW for 'stable' eg normal/steady/previous/original/set level/37°C etc accept other examples of stable states eg blood sugar/water/CO ₂ accept 'a change in the stable system results in an action that reverses the change' = 2 marks
	(b)	less blood to skin/capillaries/toes/fingers/extremities / more blood to core / more blood to vital organs; constriction of blood vessels / narrowing of blood vessels / vasoconstriction; OWTTE	2	allow surface for skin ignore constriction of capillaries
(c)	(i)	30 (%)	1	
	(ii)	34.1 ;	1	ignore all decimal places after the first eg accept 34.12 etc

Question	Answer	Marks	Guidance
(d)	<p><i>any 2 from:</i> evaporation (of water); (1) wet clothes give poor insulation; (1) (more) heat loss / water or wet clothes take in heat; (1)</p>	2	<p>ignore makes you cold / lowers body temperature</p> <p>accept energy for heat</p> <p>NB 'unable to balance heat loss with heat gain' is in the insert only give mark if clear that heat is lost</p>
(e)	<p><i>any 2 from:</i> <u>enzymes</u> work more slowly/work less well/stop working / <u>enzymes</u> are not at optimum temperature / <u>enzymes</u> work best at optimum temperature / <u>enzymes</u> optimum temperature is at normal body temperature (36.5-37.5 °C); (1) (rate of) respiration decreases / less respiration; (1) less heat released; (1)</p>	2	<p>ignore enzymes are denatured/killed/destroyed / active site changes shape eg 'enzymes are denatured and stop working' (1) for idea of stop working</p> <p>accept respiration stops ignore references to rate of breathing / heart rate etc ignore references to rate of chemical reactions</p> <p>accept energy for heat</p> <p>ignore ideas about organs shutting down</p>
	Total	14	

Question			Answer	Marks	Guidance
2	(a)	(i)	contains ions / contains Na ⁺ and Cl ⁻ ; which move / flow;	2	ignore charged particles do not allow charged atoms ignore 'carry the charge' 'carry the current' but allow 'carry the charge/current through the solution' (movement implied) ignore references to reactions at electrodes allow movement mark even if incorrect particle is specified
		(ii)	correct balancing: 2 and 2; state symbols (aq) (g) and (g);	2	do not allow AQ, G and G (must be lower case)
		(iii)	hydrogen <u>and</u> sodium hydroxide	1	both needed for mark
	(b)	(i)	chlorine green/yellow gas; bromine red liquid; allow chlorine is a gas <u>and</u> bromine is a liquid for (1)	2	accept vapour for gas accept colour of bromine as orange or brown
		(ii)	(chlorine is) more or very toxic/poisonous / small concentrations/amounts cause (serious health) problems; (chlorine) spreads quickly / is a gas;	2	accept 'it is more reactive' ignore 'harmful/dangerous/deadly' etc allow RA eg bromine is a liquid ignore melting point/boiling point

Question		Answer	Marks	Guidance	
	(c)	gain one electron / ions contain one more electron than protons / need one electron; contain 7 electrons in their outer shell / to give full outer shell	2	ignore 'gains electrons'	
	(d)	(i)	chlorine is more reactive (than iodine) ORA	1	ignore 'chloride' is more reactive accept 'chlorine is more reactive than iodide'
		(ii)	MP <u>and</u> BP <u>and</u> density increase (down the group) / all properties in the table increase;	1	need all three
			Total	13	

Question		Answer	Marks	Guidance
3	(a)	<p><i>any 4 from:</i></p> <p>magnet/electromagnet spins; (1)</p> <p>inside/beside coil of wire; (1)</p> <p>idea of changing/cutting into the magnetic field; (1)</p> <p>voltage produced; (1)</p> <p>induced/electromagnetic induction; (1)</p>	4	<p>ignore moves magnet / moves magnet in and out</p> <p>ignore the coils spin / the generator spins accept 'through the coil' for MP2</p> <p>ignore produces a current accept emf/ potential difference/volts for voltage</p> <p>if a context for induced is given must be in terms of voltage or current 'a voltage is induced' is (2) for MP4 and MP5</p>

Question	Answer	Marks	Guidance
(b)	<p>the new line drawn on the graph should :</p> <p>have a higher amplitude above and below at every peak and trough (1)</p> <p>have twice the frequency (ie 3 cycles in the same period as the 1.5 cycles shown) (1)</p> <p>eg (2)</p> 	2	cycles should be roughly evenly spaced
(c)	<p>(i) electrons collide (with atoms or positive ions) (1)</p> <p><i>any 2 from:</i> resistance in the wire; (1)</p> <p>energy is transferred to the wire/cable / electrons moving causes increase in kinetic energy (in the wire); (1)</p> <p>the wire/cable gets hot / energy is lost as heat / transfers energy to surroundings; (1)</p>	3	<p>accept 'electrons collide with particles' or 'electrons collide' alone</p> <p>do not allow 'electrons collide with electrons'</p> <p>ignore 'friction'</p> <p>ignore 'energy is lost' alone (in the question)</p>

Question		Answer	Marks	Guidance
	(ii)	more demand for power in south / idea that electricity would have less distance to travel; less power/energy <u>loss</u> (in transfer of electricity);	2	ignore 'more power stations are in the North/in Scotland' ignore 'more people live in the south' ignore 'saves energy' alone accept 'less energy wasted' accept 'less energy lost when transported'
	(d)	275(Kv) (1) 400(Kv) (1) If answer is not fully correct allow (1) mark for Either <ul style="list-style-type: none"> • 400 <u>and</u> 275 both given in reverse order or <ul style="list-style-type: none"> • working that shows $11/16 = 275/400$ 	2	answers must be in correct order
Total			13	

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