

Additional Science A

General Certificate of Secondary Education

Unit **A218/02**: Ideas in Context (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:

Annotation	Meaning
	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

Annotation	Meaning
	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).
- 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.*

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

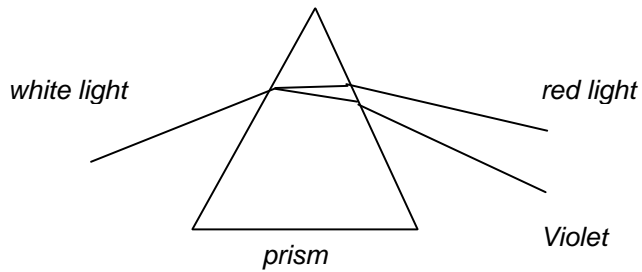
- iv. Use the **L1, L2, L3** annotations in Scoris to show your decision; do not use ticks.

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
1	(a)	any two from: sweating; breathing; faeces; tears;	1	two correct responses = 1 mark ignore respiration
	(b)	(i)	1	
		(ii)	3	accept normal for 'steady' accept 'change in concentration of blood plasma/water (in the blood) / too much or too little water (in the blood); accept 'too high or too low' as AW for 'change'
		(iii)	2	
		any two from alcohol reduces ADH production/ADH suppression; less water is (re)absorbed back (into the body) (at the kidney); more water is lost (in the urine)/greater volume of more dilute urine produced		

Question		Answer				Marks	Guidance
1	(c)		always increases	always decreases	stays the same or decreases	stays the same	2 3 correct for 2 marks 2 correct = 1 mark 1 or 0 correct = 0 marks
		sugar				✓	
		urea		✓			
		salt			✓		
	(d)	(passive overall) movement of molecules/particles; (from a region of their) high concentration to (a region of their) low concentration; 1 mark for QWC				2 1	accept urea, salt, sugar as particles ignore references to partially permeable membrane ignore concentration gradient QWC = correct spelling of non-technical terms of two or fewer syllables for a response which engages with the question
	(e)	(10 x 84) ÷ 12 =; 70 (patients each week)				2	70 = 2 marks allow 7 for (1) mark
Total					14		

Question		Answer	Marks	Guidance
2	(a) (i)	<p>at least one ray refracting correctly entering and leaving the prism (1)</p> <p>colours of spectrum in correct order i.e. red, orange, yellow, green, blue, indigo, violet - at least two (1)</p> 	2	<p>accept straight lines drawn with out a rule</p> <p>accept a vertical list</p>
	(ii)	<p>both slow down (1)</p> <p>violet light slows down more than red light = 2 marks</p>	2	<p>reject 'refracts' as change of speed</p> <p>ecf from diagram</p>
	(b)	<p>the number of cycles/waves/oscillations/vibrations produced/passing a point) (1)</p> <p>per second (1)</p>	2	
	(c)	<p>Uses $0.03 \times 10^{10} / 3 \times 10^8 / 300,000,000$ (m/s);</p> <p>Speed of light $\div 1.5 \times 10^7 / (\text{wavelength} =) \frac{\text{speed}}{\text{frequency}}$;</p> <p>20 (m);</p>	3	<p>correct answer (20m) scores 3 marks</p> <p>allow ecf from incorrect speed of light</p>
	(d) (i)	<p>the vibrations are at right angles to the direction of travel of the wave</p>	1	<p>allow information given in form of a diagram including the relative direction</p>

Question		Answer	Marks	Guidance
2	(e)	both 300 000 km/s	1	allow both 300,000,000 m/s with units
	(f)	any two from: idea of addition / constructive interference; idea of subtraction / destructive interference; wave <u>amplitudes</u> are affected (by interference);	2	allow all marks on diagrams. Summing amplitudes would need to be correct by eye and may assume same scales accept 'waves cancel each other out'
		Total	13	

Question		Answer	Marks	Guidance
3	(a)	hydrochloric acid AND 2HCl; (1) carbon dioxide AND CO ₂ ; (1) water AND H ₂ O; (1)	3	
	(b)	any two from: potassium is not safe to react with water / too reactive; potassium oxide/carbonate/hydroxide are soluble; titration gives a neutral solution	2	
	(c) (i)	any two from: add (magnesium carbonate) to (dilute) <u>sulfuric acid</u> ; add too much / add excess (magnesium carbonate) idea; filter idea;	2	
	(ii)	any two from: evaporate; to remove some water; leave to crystallise; dry the crystals in a desiccator or oven;	2	accept heat / boil not to dryness / all water accept dry on filter paper
	(iii)	mass decreases; because a gas/carbon dioxide is made;	2	
	(iv)	120; 6.0 ecf	2	(ecf = 0.05 x incorrect RFM)
Total			13	

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