

Additional Science A

General Certificate of Secondary Education

Unit **A217/01**: Modules B6, C6, P6 (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
	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

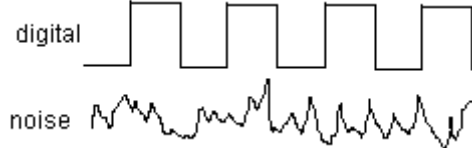
iv. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

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							
1	(a)	(i)	refraction	1								
		(ii)	speed	1								
	(b)		<p>or</p>	1	wavefronts must be closer together and drawn BOTH sides of the line							
	(c)		<table border="1" style="width: 100%; text-align: center;"> <tr> <td>radio waves</td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td>visible light</td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td>gamma rays</td> </tr> </table>	radio waves			visible light			gamma rays	2	all three correct = 2 marks one or two correct = 1 mark accept any unambiguous indication
radio waves			visible light			gamma rays						
Total				5								

Question		Answer	Marks	Guidance
2	(a)	wavelength	1	more than one response =0 marks accept any other clear indication of correct response eg tick, linking line, underlined etc.
	(b)	C	1	more than one response =0 marks accept any other clear indication of correct response eg tick, linking line, underlined etc.
	(c)	interference (1) in step (1) increases (1)	3	more than one response for a single marking point (0) accept any other clear indication of correct response eg tick, underlined etc.
Total			5	

Question		Answer	Marks	Guidance
3	(a)	modulated	1	
	(b)	<p>any three of the following(1) each</p> <p>quality of (radio) signal is lost because of the noise;</p> <p>the noise can be separated from a digital signal;</p> <p>in a (digital) receiver/before it is amplified;</p> <p>(but) not in an analogue /non digital receiver;</p> <p>digital signal is pulses/on or off/1 or 0 /binary/high or low/;</p> <p>noise is random signal/interference is signal from other sources</p>	3	<p>accept interference for noise</p> <p>accept filtered or cleaned for separated</p> <p>reject sound as signal</p> <p>accept diagrams instead of descriptions</p> 
Total			4	

Question		Answer	Marks	Guidance
4	(a)	spinal cord (1) sensory (1) synapses (1)	3	
	(b) (i)	C – axon (1)	1	
	(ii)	D – fatty sheath (1)	1	
	(c)	any three from: receptor detects stimulus; (electrical) impulse; effector makes the movement; and can include a max of 2 from receptor → sensory neurone; sensory neurone → motor neurone; motor neurone → effector;	3	accept nervous impulses accept signals if sequence which includes brain then max 1m from here.
		Total	8	

Question		Answer	Marks	Guidance
5	(a)	retrieval storage	1	both required for 1 mark
	(b)	billions experience transmit	2	all three correct = 2 marks two or one correct = 1 mark
	(c)	<p>The variety of potential pathways...</p> <div style="display: flex; align-items: center; justify-content: center;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div>	1	
Total			4	

Question		Answer	Marks	Guidance
6		<pre> graph LR A[remembering the three times table] --- B[simple reflex] A --- C[learning by repetition] D[a baby grasping his mother's finger] --- B D --- C E[putting on a coat when cold] --- F[learning by experience] </pre>	2	all three lines correct (2) two or one line correct (1)
Total			2	

Question		Answer	Marks	Guidance
7	(a)	bubbles appear	1	more than 1 response = 0 marks accept any other clear response eg underlined or ticked statements, or crosses / shaded in boxes (if no other type of response shown in boxes)
	(b) (i)	$\text{CuCO}_3 \rightarrow 2\text{HCl} + \text{CuCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$ <input type="checkbox"/> $\text{CuCO}_3 + 2\text{HCl} \rightarrow \text{CuCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$ <input checked="" type="checkbox"/> $\text{CuCO}_3 + 2\text{HCl} + \text{CuCl}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ <input type="checkbox"/> $\text{CuCO}_3 + 2\text{HCl} \rightarrow \text{CuCl}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ <input type="checkbox"/>	1	
	(ii)	solid left	1	
	(d)	evaporate some of the water	1	
Total			4	

Question		Answer	Marks	Guidance
8	(a)	<p>any three from: increase concentration of (hydrochloric acid); raise temperature; decrease particle size / increased SA of particles; add catalyst; stir/agitate/mix;</p>	2	<p>three correct = 2 marks two correct = 1 mark</p> <p>ignore more acid / more carbonate</p> <p>accept stronger acid = increase concentration of acid accept heat / warm up = raise temperature</p>
	(b) (i)		2	<p>points plotted within one square = 1 mark clear attempt to join points with a smooth curve = 1 mark ignore extended curve beyond final plot allow ecf from incorrectly plotted points for the correct curve = 1 mark max.</p>
	(ii)	<p>any one from: (acid) concentration falls; less copper carbonate; fewer particles (to react)</p>	1	<p>ignore gas / CO₂ runs out / used up ignore runs out of energy ignore less acid accept less (copper) carbonate / particles to react with reject one or both reactants (completely) used up.</p>
Total			5	

Question		Answer	Marks	Guidance
9	(a)	A C	1	either order
	(b)	sodium chloride, water	1	either order
	(c)	potassium hydroxide <input checked="" type="checkbox"/> <input type="checkbox"/> calcium hydroxide <input checked="" type="checkbox"/> <input type="checkbox"/>	1	both ticks must be present for 1 mark
	(d)	25.0	1	
	(e)	36%	1	
		Total	5	

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