



GCSE

## Additional Science A

General Certificate of Secondary Education

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

## Mark Scheme for January 2011

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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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## Guidance for Examiners

Additional Guidance within any mark scheme takes precedence over the following guidance.

1. Mark strictly to the mark scheme.
2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.
3. Accept any clear, unambiguous response which is correct, e.g. mis-spellings if phonetically correct (but check additional guidance).
4. Abbreviations, annotations and conventions used in the detailed mark scheme:

/	= alternative and acceptable answers for the same marking point
(1)	= separates marking points
<b>not/reject</b>	= answers which are not worthy of credit
<b>ignore</b>	= statements which are irrelevant - applies to neutral answers
<b>allow/accept</b>	= 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	= alternative wording
ORA	= or reverse argument

*e.g. mark scheme shows 'work done in lifting / (change in) gravitational potential energy' (1)*

*"work done" = 0 marks*

*"work done lifting" = 1 mark*

*"change in potential energy" = 0 marks*

*"gravitational potential energy" = 1 mark*

5. If a candidate alters his/her response, examiners should accept the alteration.
6. 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.

The example below illustrates how to apply this principle to an objective question.

e.g. for a one mark question, where ticks in boxes 3 and 4 are required for the mark

Put ticks (✓) in the two correct boxes.

✓
✗

*This would be worth zero marks.*

Put ticks (✓) in the two correct boxes.

✗
✗

*This would be worth one mark.*

Put ticks (✓) in the two correct boxes.

✗
✗
✓
✓

*This would be worth one mark.*

7. 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.

8. Marking method for tick boxes:

Always check the additional guidance.

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. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses.

Credit should be given for each box correctly ticked. 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 a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

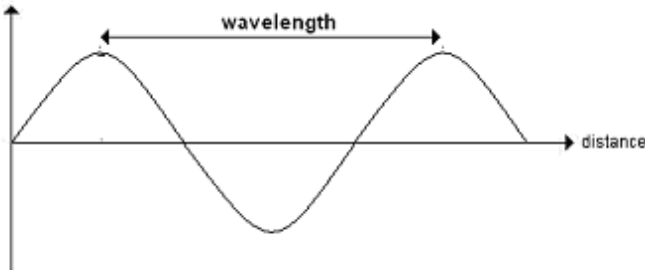
***the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out).***

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

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Question			Expected Answers	Marks	Additional Guidance
1	a			[2]	<p>Look for a wave with a least one cycle; it doesn't have to cross the axis. <b>Accept</b> varying wavelength / amplitude.</p> <p><b>Accept</b> a longitudinal wave.</p> <p>Accept arrow length by eye.</p>
	b	i	<p>Decreases (1)</p> <p>Stays the same (1)</p>	[2]	
		ii	<div style="display: flex; justify-content: flex-end; align-items: center; gap: 10px;"> <div style="border: 1px solid black; width: 30px; height: 30px; margin-bottom: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-bottom: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-bottom: 5px;"></div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-bottom: 5px; text-align: center; line-height: 30px;">✓</div> <div style="border: 1px solid black; width: 30px; height: 30px; margin-bottom: 5px; text-align: center; line-height: 30px;">✓</div> </div> <p>The intensity of the light ...</p> <p>The colour seen ...</p>	[2]	<p>Correct pattern for [2] marks. One mistake for [1] mark.</p> <p>A mistake is</p> <ul style="list-style-type: none"> <li>• a missing tick</li> <li>• a tick in the wrong place</li> <li>• an extra tick</li> </ul>
			<b>Total</b>	<b>[6]</b>	

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Question		Expected Answers	Marks	Additional Guidance
2	a	Analogue (1)	[1]	Accept any unambiguous correct response.
	b	<div style="text-align: right;"> <input type="checkbox"/>  <input checked="" type="checkbox"/> (1)  <input type="checkbox"/>  <input type="checkbox"/> </div> <p>The amplitudes of both ...</p>	[1]	Correct pattern for [1] mark.
	c	<p><b>Any two from:</b></p> <p>noise;</p> <p>will be reduced / eliminated / less;</p> <p>[because radio signal] is digital;</p> <p>[Signal / voice] is clearer / easier to clean</p>	[2]	Accept interference / hiss / crackle owtte instead of noise.
		<b>Total</b>	<b>[4]</b>	

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3	a	i	Diffraction (1)	[1]	
		ii	<p>Light has a wave nature. <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>The size of the hole ... <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	[2]	
	b		A (1)	[1]	
			<b>Total</b>	<b>[4]</b>	

Question			Expected Answers	Marks	Additional Guidance
4	a	i	Rapid Involuntary	[1]	Both needed for 1 mark.
		ii	<div><div><div><div><div></div></div></div><div><div><div></div></div></div><div><div><div></div></div></div><div><div><div></div></div></div></div><div>... environment.</div><div><div><div><div><div></div></div></div><div><div><div></div></div></div></div><div><div><div></div></div></div></div><div>(1)</div></div>	[1]	
	b		<div><div><div><div><div>C</div></div><div>B</div><div>A</div><div>E</div><div>D</div></div></div></div>	[2]	Correct pattern for [2] marks. B directly before A [1] mark. Remember <b>black</b> ants eat <b>daisies</b> .
	c	i	Axon (1)	[1]	

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		ii	<div style="text-align: right;"> <input type="checkbox"/>  <input type="checkbox"/>  It speeds up the impulse. <input checked="" type="checkbox"/> (1)  <input type="checkbox"/> </div>	[1]	
	d		Any suitable example (1) Way it helps survival (1)	[2]	Mark both sections together.  Second mark can only be awarded in the light of the stated response. A wrong response may still get the second mark.  The question is asking for the <b>response</b> . Second mark is for the reason that helps survival.  No ecf.  Reflex the wrong way round [bright light makes pupil expand] CON for the first mark.
			<b>Total</b>	<b>[8]</b>	



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Question			Expected Answers	Marks	Additional Guidance
5	a		<div style="text-align: right;"><input type="checkbox"/></div> <div style="text-align: right;">New experiences cause new ... <input checked="" type="checkbox"/> (1)</div> <div style="text-align: right;">Repetition makes new pathways ... <input checked="" type="checkbox"/> (1)</div> <div style="text-align: right;"><input type="checkbox"/></div> <div style="text-align: right;"><input type="checkbox"/></div>	[2]	<p>Correct pattern for [2] marks. One mistake for [1] mark.</p> <p>A mistake is:</p> <ul style="list-style-type: none"> <li>• a tick in the wrong place</li> <li>• an extra tick.</li> </ul>
	b	i	Consciousness (1) Language (1)	[2]	1 mark for each. Deduct 1 mark for each extra choice indicated. <b>Accept</b> any clear response.
		ii	<b>Any two from:</b> studies of patients with brain damage; electrical stimulation of parts of the brain; [brain] scan	[2]	
			<b>Total</b>	<b>[6]</b>	

Question			Expected Answers	Marks	Additional Guidance
6	a		A and B	[1]	Either order.

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	<b>b</b>	<p><u>Major points</u> (one mark each)</p> <p>[add acid until indicator] <b>changes</b> colour / reference to colour <b>change</b></p> <p>measure [total amount of acid run in] / [acid] measurement at end</p> <p><u>Minor points</u> (one mark for any one of the following, to a maximum of 2 marks)</p> <p>measure burette reading at start [add acid] slowly / drop by drop swirl / stir / mix [the flask contents] repeat the titration</p>	<p>[2]</p> <p>[2]</p>	<p>Accept any reference to colour change e.g. 'acid changes colour'.</p> <p>Ignore the precise colour of the indicator e.g. 'when indicator turns green' gets the mark for 'turns'.</p> <p>'Neutralises' is insufficient for colour change.</p> <p>Ignore references to time.</p>
	<b>c</b>	Sodium hydroxide Sodium sulfate	[1]	Must be in correct order.
	<b>d</b>	<p>potassium hydroxide <input checked="" type="checkbox"/></p> <p>calcium hydroxide <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	[1]	Both ticks must be present.
		<b>Total</b>	<b>[7]</b>	

Question	Expected Answers	Marks	Additional Guidance
7 a	Citric acid (1)	[1]	
b	Neutralisation (1)	[1]	

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	<b>c</b>		The remaining impurities ... <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	[1]	
	<b>d</b>		0.02%   2%   50% <b>98%</b>	[1]	
			<b>Total</b>	<b>[4]</b>	

<b>8</b>	<b>a</b>	<b>i</b>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> how acidic or alkaline ... <input checked="" type="checkbox"/> (1)	[1]	
		<b>ii</b>	1   6 <b>7</b> 14	[1]	
	<b>b</b>		$\frac{1}{35.5}$ $\frac{35.5}{1}$ 35.5-1 <b>35.5+1</b>	[1]	
			<b>Total</b>	<b>[3]</b>	

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