

## **Additional Science A**

General Certificate of Secondary Education

Unit **A216/01**: Modules B5, C5, P5 (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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Any enquiries about publications should be addressed to:

OCR Publications  
PO Box 5050  
Annesley  
NOTTINGHAM  
NG15 0DL

Telephone: 0870 770 6622  
Facsimile: 01223 552610  
E-mail: [publications@ocr.org.uk](mailto:publications@ocr.org.uk)

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	✓	×	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	×		✓		✓	✓		✓	
<b>Score:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>NR</b>

Question		Expected Answers			Marks	Additional Guidance
1	(a)		<b>name</b>		<b>formula</b>	[2] Four lines correct = 2 marks Two or three lines correct = 1 mark
			argon		H <sub>2</sub> O	
			carbon dioxide		Ar	
			oxygen		CO <sub>2</sub>	
	water vapour	O <sub>2</sub>				
	(b)		<b>formula</b>		<b>structure</b>	[2] Three lines correct = 2 marks Two or one line(s) correct = 1 mark
			Ar			
			CO <sub>2</sub>			
	O <sub>2</sub>					

	(c)		molecules are small (1) forces between molecules weak (1)	[2]	<b>Accept</b> bonds for forces. <b>Ignore</b> distance between molecules. <b>Ignore</b> references to motion of molecules.														
			<b>Total</b>	[6]															
2	(a)		<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td>iron oxide</td> <td>+</td> <td>carbon</td> <td>→</td> <td>iron</td> <td>+</td> <td>carbon dioxide</td> </tr> </table>								iron oxide	+	carbon	→	iron	+	carbon dioxide	[2]	Left hand side iron oxide and carbon in either order. Right hand side iron and carbon dioxide in either order. All four boxes correct = 2 marks Any two or three boxes correct = 1 mark <b>Allow</b> carbon monoxide or carbon oxide as alternatives to carbon dioxide. <b>Reject</b> chemical symbols instead of words.
iron oxide	+	carbon	→	iron	+	carbon dioxide													
	(b)		oxidised reduced	[1]	<b>Both</b> must be correct for one mark <b>Allow</b> reduce, oxidise etc. <b>remember ore</b>														
			<b>Total</b>	[3]															
3	(a)		burned (1) carbon dioxide (1)	[2]															
	(b)		3 (1)	[1]															
	(c)		Refers to arrows/carbon flow/amounts (102) in or out/ carbon exchange / ... between land life (and atmosphere) (1) Idea that the same amount (102) goes in both directions (1)	[2]															
			<b>Total</b>	[5]															
4			<b>Any three from:</b> balloons repel/push each other; balloons have charge (by friction); both have positive/negative/same (charge); (by transfer of) <u>electrons</u>	[3]	<b>Accept</b> static (electricity) instead of charge. <b>Not</b> static fields. <b>Ignore</b> retract.  "Balloons have the same charge" worth [2]. Apply list principle.														
			<b>Total</b>	[3]															

5	(a)		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Increase the voltage... <input checked="" type="checkbox"/> (1)	[1]	
	(b)		amps electrons heats up	[2]	All three correct = 2 marks Any two or one correct = 1 mark
			<b>Total</b>	[3]	
6	(a)		<input type="checkbox"/> <input type="checkbox"/> All parts of the circuit... <input checked="" type="checkbox"/> (1) <input type="checkbox"/> The same amount of charge... <input checked="" type="checkbox"/> (1)	[2]	Both correct = 2 marks One mistake = 1 mark  A mistake is <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)	(i)	C (1)	[1]	
		(ii)	3 V (1)	[1]	
			<b>Total</b>	[4]	
7	(a)		the magnet spins / rotates / turns inside the coil (1) called (electromagnetic) induction (1)	[2]	<b>Accept</b> coil spinning as alternative to magnet spinning. <b>Not</b> moving the magnet in and out of the coil. <b>Accept</b> induced, but <b>not</b> electromagnetic on its own.

	(b)		<b>Any two from:</b> spin/move the magnet faster; use a stronger magnet; more (turns of) wire in the coil; put iron inside the coil	[2]	<b>Accept</b> spin coil faster as alternative to spin the magnet faster. <b>Not</b> bigger/more magnets. <b>Accept</b> larger coil. <b>Apply</b> list principle.
			<b>Total</b>	[4]	
8	(a)		mitosis (1)	[1]	<b>Look for</b> correct consonants i.e. m, t, s and s.
	(b)	(i)	nucleus (1)	[1]	
		(ii)	proteins (1)	[1]	
	(c)		<b>Any three from:</b> idea that genes control features; idea of different genes for gills / wings; idea that genes can switch on/off; idea that some (genes switch)	[3]	<b>Accept</b> inactive/active for on/off. "Genes make wings" is just worth [1]. "Some genes make wings, others make gills" is just worth [2]. "Gills are controlled by some genes which can be switched on" is definitely worth [3].
			<b>Total</b>	[6]	
9	(a*)		stem (1)	[1]	
	(b)		(plant/growth) hormone (1)	[1]	<b>Accept</b> auxin
	(c)		Some unspecialised cells...tissues. <input checked="" type="checkbox"/> (1)  Some unspecialised cells...organs. <input checked="" type="checkbox"/> (1)  <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	[2]	Both correct = 2 marks One mistake = 1 mark  A mistake is <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>
	(d)	(i)	phototropism (1)	[1]	

		(ii)		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1)	[1]	
			<b>Total</b>		[6]	
10	(a)		double helix (1)		[1]	
	(b)		2 then 4		[1]	Both must be correct for one mark.
			<b>Total</b>		[2]	

**OCR (Oxford Cambridge and RSA Examinations)**  
**1 Hills Road**  
**Cambridge**  
**CB1 2EU**

**OCR Customer Contact Centre**

**14 – 19 Qualifications (General)**

Telephone: 01223 553998

Facsimile: 01223 552627

Email: [general.qualifications@ocr.org.uk](mailto:general.qualifications@ocr.org.uk)

**[www.ocr.org.uk](http://www.ocr.org.uk)**

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**Head office**  
**Telephone: 01223 552552**  
**Facsimile: 01223 552553**