



GCSE

## Science A

General Certificate of Secondary Education

Unit **A212/01**: Unit 2: Modules B2, C2, P2 (Foundation Tier)

# Mark Scheme for June 2012

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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
<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	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 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.

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## 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	✓	✗	✓	✓	✓				✓	
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>

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)		nylon	1	
	(b)		hydrocarbons; (1) refined; (1) polymers; (1)	3	
	(c)		4	1	more than one number circled = 0 marks
			<b>Total</b>	<b>5</b>	

Question			Answer	Marks	Guidance								
2	(a)		<table border="1"> <thead> <tr> <th>true</th> <th>false</th> </tr> </thead> <tbody> <tr> <td>✓</td> <td></td> </tr> <tr> <td>✓</td> <td></td> </tr> <tr> <td></td> <td>✓</td> </tr> </tbody> </table>	true	false	✓		✓			✓	2	all 3 lines correct = 2 marks 2 lines correct = 1 mark
true	false												
✓													
✓													
	✓												
	(b)		<p>any two from:</p> <p>saves on non renewable resources / (named) raw materials; (1)  saves on energy in <b>extracting raw materials</b>; (1)  saves on pollution caused by <b>extracting raw materials</b>; (1)</p> <p>uses less landfill space AW / landfills are an eyesore; (1)  idea of non-biodegradable / will not rot; (1)</p>	2	<b>ignore</b> ideas of damage to the environment <b>ignore</b> "might run out of plastic" <b>ignore</b> "can use again"  <b>ignore</b> gases produced by decomposition								
			<b>Total</b>	<b>4</b>									

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Question			Answer	Marks	Guidance
3	(a)	(i)	4 (mm)	1	
		(ii)	23.5 (mm)	1	<b>allow</b> 23 – 24
	(b)	(i)	ring drawn around point at (400,12.5)	1	
		(ii)	point does not fit pattern / does not fit into the graph or WTTE (1)  repeat / discard / ignore (1)	2	<b>accept</b> idea of wrong measurement <b>ignore</b> vague comments e.g. human error
			<b>Total</b>	<b>5</b>	

Question			Answer	Marks	Guidance								
4	(a)		<table border="1"> <tr> <td>The user never goes near the microwave oven.</td> <td></td> </tr> <tr> <td>The walls and door of the oven stop microwaves escaping.</td> <td>✓</td> </tr> <tr> <td>Microwaves are part of the electromagnetic spectrum.</td> <td></td> </tr> <tr> <td>Microwave ovens heat food very quickly.</td> <td></td> </tr> </table>	The user never goes near the microwave oven.		The walls and door of the oven stop microwaves escaping.	✓	Microwaves are part of the electromagnetic spectrum.		Microwave ovens heat food very quickly.		1	
The user never goes near the microwave oven.													
The walls and door of the oven stop microwaves escaping.	✓												
Microwaves are part of the electromagnetic spectrum.													
Microwave ovens heat food very quickly.													
	(b)		water (particles) absorb / are vibrated by microwaves (1);  ovens are of high power / phones are of low power (1);	2	<b>accept</b> excited  <b>accept</b> energy / frequency								
			<b>Total</b>	<b>3</b>									

Question			Answer	Marks	Guidance
5			photons (1); absorbed (1);	2	
			<b>Total</b>	<b>2</b>	

Question		Answer	Marks	Guidance
6	(a)	<p>Keeping cool by swimming in the sea. <input type="checkbox"/></p> <p>Putting sun-screen on burnt skin before going to bed. <input type="checkbox"/></p> <p>Staying indoors in the daytime. <input checked="" type="checkbox"/></p> <p>Sunbathing by the side of a swimming pool. <input type="checkbox"/></p> <p>Wearing cotton clothes that cover the body. <input checked="" type="checkbox"/></p>	2	
	(b)	<p><b>must</b> include 1 benefit, 1 risk and 1 assessment of risk            1 benefit; (1)            1 risk; (1)</p> <p>assessment of risk:            benefit outweighs risk/risk (thought to be) small (1)</p> <p>OR</p> <p>increased risk due to increased height / sun reflecting off snow (1)</p> <p>OR</p> <p>idea of reduction of risk e.g. suncream, sunglasses, exposing less skin (1)</p>	3	<p>Benefits:</p> <ul style="list-style-type: none"> <li>• enhances appearance</li> <li>• social acceptance of activity</li> <li>• 'good for general health' i.e. produces vitamin D in skin</li> <li>• outdoor activities are pleasant / fun</li> </ul> <p>Risks</p> <ul style="list-style-type: none"> <li>• risk of (skin) cancer</li> <li>• damage to cells/DNA / causes mutations</li> <li>• sunburn</li> <li>• cataracts</li> </ul> <p>credit answer that understands perceived risk and actual risk being different  <b>ignore</b> other risks associated with rock climbing / skiing like falling off</p>
			<b>Total</b>	<b>5</b>

Question			Answer	Marks	Guidance
7	(a)	(i)	250 ( $\text{J m}^{-2} \text{s}^{-1}$ )	1	
		(ii)	530 ( $\text{J m}^{-2} \text{s}^{-1}$ )	1	
	(b)	(i)	<b>B</b> (70) and <b>E</b> (490)	1	<b>both</b> needed in any order <b>accept</b> energies instead of letters
		(ii)	<b>A</b> (250) (1)	1	<b>accept</b> energy instead of letter
			<b>Total</b>	<b>4</b>	

Question			Answer	Marks	Guidance															
8	(a)		<table border="1"> <thead> <tr> <th rowspan="2">Volunteer</th> <th colspan="3">The antibiotic tested for...</th> </tr> <tr> <th>..effectiveness only.</th> <th>..safety only.</th> <th>..effectiveness and safety.</th> </tr> </thead> <tbody> <tr> <td>healthy</td> <td></td> <td>✓</td> <td>(1)</td> </tr> <tr> <td>ill</td> <td></td> <td>✓</td> <td>(1)</td> </tr> </tbody> </table>	Volunteer	The antibiotic tested for...			..effectiveness only.	..safety only.	..effectiveness and safety.	healthy		✓	(1)	ill		✓	(1)	2	
Volunteer	The antibiotic tested for...																			
	..effectiveness only.	..safety only.	..effectiveness and safety.																	
healthy		✓	(1)																	
ill		✓	(1)																	
	(b)		<p>Always complete a course of treatment. <input checked="" type="checkbox"/></p> <p>Only take antibiotics when necessary. <input checked="" type="checkbox"/></p> <p>Stop taking antibiotics when you feel better. <input type="checkbox"/></p> <p>Take antibiotics for all illnesses. <input type="checkbox"/></p> <p>Test antibiotics on animals before giving them to humans. <input type="checkbox"/></p>	2																
			<b>Total</b>	<b>4</b>																

Question		Answer	Marks	Guidance
9	(a)	immune;	1	
	(b)	form of a (disease causing) organism / virus / bacterium / pathogen / antigen (1);  that is safe / dead / modified / inactive (1)	2	<b>ignore</b> antibodies <b>ignore</b> "form of a disease" unless qualified with organism  <b>accept</b> weakened / weaker <b>ignore</b> weak
	(c)	(i) <i>any two from:</i> makes him immune to all of the diseases (in the list) (1); each vaccination is for different micro-organisms/disease (1); vaccine causes antibody production (1); different antibodies are needed to recognise different micro-organisms (1)	2	<b>ignore</b> "makes him immune"
		(ii) <i>any one from:</i> antibodies not produced any longer; (1) immune system needs boosting; (1) reference to decreasing number of memory cells; (1)	1	<b>accept</b> microorganisms changing/mutate/ different strain <b>accept</b> vaccination/immunity wears off  <b>ignore</b> tetanus is a virus <b>ignore</b> any reference to injury
	(d)	There are side effects that could be harmful for some people. <input type="checkbox"/>  It would prevent large numbers of people getting the disease. <input checked="" type="checkbox"/>  Individuals may get the disease. <input type="checkbox"/>  Some children who are vaccinated will get a mild form of the disease. <input type="checkbox"/>	1	more than 1 tick = 0 marks
			Total	7

Question		Answer	Marks	Guidance																		
10	(a)	glucose/sugar/protein/amino acids/fat/fatty acids/glycerol/oxygen/O <sub>2</sub> ; carbon dioxide/CO <sub>2</sub> ; fat (deposits)/plaque/cholesterol	2	3 correct = (2), 2 correct = (1) <b>ignore</b> food <b>accept</b> water <b>ignore</b> lactic acid <b>ignore</b> clot																		
	(b)	<table border="1"> <thead> <tr> <th>Lifestyle factor</th> <th>Increases risk</th> <th>Decreases risk</th> </tr> </thead> <tbody> <tr> <td>alcohol</td> <td>✓</td> <td></td> </tr> <tr> <td>exercise</td> <td></td> <td>✓</td> </tr> <tr> <td>saturated fat</td> <td>✓</td> <td></td> </tr> <tr> <td>smoking</td> <td>✓</td> <td></td> </tr> <tr> <td>stress</td> <td>✓</td> <td></td> </tr> </tbody> </table>	Lifestyle factor	Increases risk	Decreases risk	alcohol	✓		exercise		✓	saturated fat	✓		smoking	✓		stress	✓		1	all correct for 1 mark
Lifestyle factor	Increases risk	Decreases risk																				
alcohol	✓																					
exercise		✓																				
saturated fat	✓																					
smoking	✓																					
stress	✓																					
		<b>Total</b>	<b>3</b>																			

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