



GCSE

Science A

General Certificate of Secondary Education

Unit **A212/01**: Unit 2: Modules B2, C2, P2 (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.

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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, eg 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
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	= alternative wording
ORA	= or reverse argument

eg 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.

eg 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, eg 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, eg 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.

eg 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]	all 4 rows correct = 2 marks 3 or 2 rows correct =1 mark	
		material	single chemical	mixture			
		crude oil		✓			
		ethene	✓				
		iron	✓				
	wood		✓				
	(b)				[2]	all 3 rows correct = 2 marks 2 rows correct =1 mark	
			better ...	worse ...			no different ...
		does not break	✓				
		transparent					✓
		less dense	✓				

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Question		Expected Answers	Marks	Additional Guidance
1	(c)	any correct example and use property with explanation relevant to example.	[1] [2]	if the material is glass, 0 marks for whole question first mark is for both the material <u>and</u> the use must be a material, not the name of an object. material being replaced must not be a plastic eg polystyrene cups = 0 marks cardboard box = 1 mark reasons must be correct for context given eg iron used in buckets(1) lighter to carry(1) and does not rust(1) examples of possible reasons easier to make stronger transparent doesn't tear cost waterproof plastic rots less easily [even for chairs!] even though there may be 0 marks for the first point, credit may still be given for reasons if they make sense – but they must have made some partial suggestion for the material+use eg "metal used for coke cans" loses first mark, but may get the rest eg blank line, then 'plastic bags' then 'weigh less & more flexible' = 2 marks allow 'plastic easier to recycle than pottery' [but see ignore section for others] ignore plastic chairs stronger than wooden ones plastic is easier to recycle than metal/paper/wood volume of plastic is less reference to biodegradable plastics safety unless suitably qualified plastic lighter than cardboard saves trees
Total			[7]	

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Question			Expected Answers	Marks	Additional Guidance
2	(a)	(i)	<div> <div></div> <div></div> <div>Less than half</div> <div> <input checked="" type="checkbox"/> </div> <div>(1)</div> </div>	[1]	tick in any other box = 0 marks
		(ii)	<div> <div></div> <div></div> <div>We cannot process anymore</div> <div> <input checked="" type="checkbox"/> </div> <div>(1)</div> </div>	[1]	tick in any other box = 0 marks
		(iii)	<div> <div>Build more recycling plants</div> <div> <input checked="" type="checkbox"/> </div> <div>(1)</div> <div></div> <div></div> <div>Make less waste</div> <div> <input checked="" type="checkbox"/> </div> </div>	[2]	1 mark for each correct tick if 3 ticks deduct 1 mark 4 ticks = 0 marks

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Question			Expected Answers	Marks	Additional Guidance
2	(a)	(iv)	<div> <input type="checkbox"/> </div> <div> Energy is used to transport ... China <input checked="" type="checkbox"/> (1) </div> <div> <input type="checkbox"/> </div> <div> <input type="checkbox"/> </div> <div> <input type="checkbox"/> </div>	[1]	tick in any other box = 0 marks
2	(b)		any two reasonable points OR one valid point plus explanation	[2]	examples lowers the need for fuel/crude oil/fossil fuels; that is a non-renewable resource; less need for landfill - as waste is removed by burning it; no need to send it to China / energy of transport waste is a renewable resource [but ignore waste is an energy source] <u>ignore</u> cost, "eco friendly", less recycling, less pollution, reduces amount of waste, waste would be an energy source increase the energy in Britain global warming related to CO ₂ , less CO ₂ [including for transportation]
			Total	[7]	

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Question			Expected Answers	Marks	Additional Guidance
3	(a)		<div>absorbed by food</div> <div><input checked="" type="checkbox"/></div> <div>(1)</div> <div><input type="checkbox"/></div> <div><input type="checkbox"/></div> <div><input type="checkbox"/></div>	[1]	tick in any other box = 0 marks
	(b)		<div>More photons per second</div> <div><input type="checkbox"/></div> <div><input type="checkbox"/></div> <div><input checked="" type="checkbox"/></div> <div>(1)</div> <div><input type="checkbox"/></div>	[1]	tick in any other box = 0 marks
	(c)	(i)	<div>Donna</div> <div><input type="checkbox"/></div> <div><input type="checkbox"/></div> <div><input type="checkbox"/></div> <div><input checked="" type="checkbox"/></div> <div>(1)</div>	[1]	tick in any other box = 0 marks

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Question			Expected Answers	Marks	Additional Guidance
3	(c)	(ii)	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">Anne</div> <div style="display: flex; flex-direction: column; align-items: center;"> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="margin-left: 10px;">(1)</div> </div>	[1]	tick in any other box = 0 marks
			Total	[4]	

Question			Expected Answers	Marks	Additional Guidance
4			animals respire / give off CO ₂ / take in O ₂ plants photosynthesise / take in CO ₂ / give off O ₂	[2]	process must be correctly tied to plant or animal. unqualified "it" refers to carbon dioxide [in the context of this question] allow plants 'breathe', on this occasion we are not testing a detailed understanding of photosynthesis. allow animals decay to give off CO ₂ "plants and animals photosynthesise" = 0 for the whole question ignore <ul style="list-style-type: none"> - plants respiring / giving off CO₂ - eating references, - references to methane
			Total	[2]	

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Question			Expected Answers	Marks	Additional Guidance
5	(a)	(i)	10°C (1)	[1]	
		(ii)	17°C (1)	[1]	accept 17 to 17.2
	(b)		qualitative comparison of the two graphs (1) with both variables mentioned by name (1)	[2]	eg patterns match / the two graphs look the same = 1 mark temperature and CO ₂ levels go up at the same time = 2 marks ignore "there is a correlation"
			Total	[4]	

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Question			Expected Answers					Marks	Additional Guidance							
6	(a)		<table><tr><td>(radio)</td><td></td><td>(IR)</td><td>(light)</td><td></td><td>X-Rays</td><td>(gamma)</td></tr></table>					(radio)		(IR)	(light)		X-Rays	(gamma)	[1]	check to see that X-rays has not been written in more than one position, if so = 0 marks apart from that, ignore anything else written in the other boxes
(radio)		(IR)	(light)		X-Rays	(gamma)										
	(b)		<div><div></div><div></div><div></div><div>X-rays are transmitted<div><input checked="" type="checkbox"/></div>(1)</div></div>					[1]	tick in any other box = 0 marks							
	(c)		<div><div></div><div></div><div></div><div>benefit outweighs risk<div><input checked="" type="checkbox"/></div>(1)</div></div>					[1]	tick in any other box = 0 marks							
	(d)		<div><div></div><div></div><div>weaker further from tube<div><input checked="" type="checkbox"/></div>(1)</div><div></div></div>					[1]	tick in any other box = 0 marks							
			Total					[4]								

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Question			Expected Answers	Marks	Additional Guidance
7	(a)	(i)	1972 and lower (1)	[1]	both needed for the mark
		(ii)	any two reasonable suggestions, eg: fewer people smoke; (improvement in) diet; (men take more) exercise; (men drink less) alcohol;	[2]	<p>max 2 reasons must be plausible to the candidate – we are not after precise historical knowledge accept any reasonable ideas.</p> <p>ideas must be different “Men do more sport and take more exercise” = 1 only</p> <p>ignore <i>general</i> statements about healthy lifestyle – “they would be more healthy”, “more fitness”, “cleaner lifestyle”</p> <p>direction of change not needed eg “change in diet” if direction given, it must be correct.</p> <p>medical arguments must be about lifestyle, eg “more men are vaccinated” not ‘more doctors’</p> <p>treat food as different from alcohol</p> <p>“they do different jobs” – not enough unless more detail given</p>
	(b)		1(1) and 3 (1)	[2]	either order
			Total	[5]	

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Question			Expected Answers	Marks	Additional Guidance
8	(a)	(i)	<div> <input type="checkbox"/> </div> <div> <input type="checkbox"/> </div> <div> <input type="checkbox"/> </div> <div> vaccines trigger ... antibodies <input checked="" type="checkbox"/> (1) </div>	[1]	tick in any other box = 0 marks
		(ii)	<div> antibiotics don't kill viruses <input checked="" type="checkbox"/> (1) </div> <div> <input type="checkbox"/> </div> <div> <input type="checkbox"/> </div> <div> <input type="checkbox"/> </div>	[1]	tick in any other box = 0 marks

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Question			Expected Answers	Marks	Additional Guidance																							
8	(a)	(iii)	<p>one from for stopping cost too great; risk of side effects is too great compared to getting flu; vaccinated people run the risk to protect others which is not fair;</p> <p>one from against stopping vaccination would stop an epidemic, benefiting everyone; flu is a dangerous disease; less than 1 in 100 000 affected by side effects; Individuals should have been able to decide for themselves;</p>	[2]	<p>if the statement is copied out from the text but not amplified in any way, treat as follows</p> <p><u>for stopping</u> it would cost \$137 million side effects occurred [in 500] some people died</p> <p><u>against stopping</u> side effects in less than 1 in 100 000 most people recovered [from side effects]</p> <p><u>neutral</u> most recovered but some died less than a quarter had been vaccinated</p> <p>“only less than a quarter had been vaccinated” is a point against stopping</p>																							
8	(b)	(i)	<table><tr><th rowspan="2">stage</th><th colspan="3">test used to check</th></tr><tr><th>effectiveness</th><th>safety</th><th>both</th></tr><tr><td>human cells grown in the laboratory</td><td></td><td></td><td>✓</td></tr><tr><td>animals</td><td></td><td></td><td>✓</td></tr><tr><td>healthy volunteers</td><td></td><td>✓</td><td></td></tr><tr><td>people with the illness</td><td></td><td></td><td>✓</td></tr></table>	stage	test used to check			effectiveness	safety	both	human cells grown in the laboratory			✓	animals			✓	healthy volunteers		✓		people with the illness			✓	[2]	<p>all 4 correct = 2 marks 3 or 2 correct = 1 mark 1 correct = 0 marks</p>
stage	test used to check																											
	effectiveness	safety	both																									
human cells grown in the laboratory			✓																									
animals			✓																									
healthy volunteers		✓																										
people with the illness			✓																									

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Question			Expected Answers	Marks	Additional Guidance
8	(b)	(ii)	<p>The claim has been checked ... <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	[1]	tick in any other box = 0 marks
8	(c)		<div> <div>only use antibiotics ...</div> <div>always finish a course ...</div> </div> <div> <div>... important to kill all ... bacteria</div> <div></div> <div></div> <div></div> <div>... more often antibiotics ...</div> </div>	[2]	more than one line from a left hand box = 0 for that box
			Total	[9]	

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