

Science A

General Certificate of Secondary Education

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

Mark Scheme for June 2011

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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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Question			Answer	Mark	Guidance												
1	a	i	<div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> To find out if the results are repeatable. <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </div>	1													
		ii	50 (1)	1													
		iii*	any two from: outlier / anomaly / 34 far outside other values / 34 is an outlier; outlier discarded; lowest and highest of other values;	2	answer such as 'ignore/discard 34' get 2 marks allow 'most of the values are in this range' for 3 rd marking point												
	b		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td style="width: 150px; height: 20px;"></td><td style="width: 30px;"></td></tr> <tr><td style="width: 150px; height: 20px;"></td><td style="width: 30px;"></td></tr> <tr><td style="width: 150px; height: 20px; text-align: center;">molecule</td><td style="width: 30px; text-align: center;">✓</td></tr> </table> (1) <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td style="width: 150px; height: 20px;"></td><td style="width: 30px;"></td></tr> <tr><td style="width: 150px; height: 20px;"></td><td style="width: 30px;"></td></tr> <tr><td style="width: 150px; height: 20px; text-align: center;">sliding over each other.</td><td style="width: 30px; text-align: center;">✓</td></tr> </table> (1)					molecule	✓					sliding over each other.	✓	2	1 mark for each correct answer
molecule	✓																
sliding over each other.	✓																
Total				6													

Question		Answer	Mark	Guidance												
2	a	<input type="checkbox"/> <input type="checkbox"/> New trees can be planted ... <input checked="" type="checkbox"/> (1) Poly(ethene) is made from crude oil. <input checked="" type="checkbox"/> (1) <input type="checkbox"/>	2													
	b	<table border="1"> <thead> <tr> <th></th> <th>true</th> <th>false</th> </tr> </thead> <tbody> <tr> <td>1.7 MJ of energy is used in the life cycle of a paper bag.</td> <td>✓</td> <td></td> </tr> <tr> <td>2.4 MJ of energy is used in the life cycle of a poly(ethene) bag.</td> <td></td> <td>✓</td> </tr> <tr> <td>The life cycle of a paper bag uses 0.3 MJ more energy than a poly(ethene) bag.</td> <td>✓</td> <td></td> </tr> </tbody> </table>		true	false	1.7 MJ of energy is used in the life cycle of a paper bag.	✓		2.4 MJ of energy is used in the life cycle of a poly(ethene) bag.		✓	The life cycle of a paper bag uses 0.3 MJ more energy than a poly(ethene) bag.	✓		2	all 3 correct = 2 marks 2 or 1 correct = 1 mark
	true	false														
1.7 MJ of energy is used in the life cycle of a paper bag.	✓															
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	c	candidate is aware that there are fewer journeys (with polythene bags than paper bags) (1); candidate is aware that there is less pollution (1)	2	allow implication that less fuel/energy used in transportation ignore answers relating to sustainability of fuel												

Question			Answer	Mark	Guidance
2	d		<input type="checkbox"/> <input type="checkbox"/> ... recycled, burned or thrown away? <input checked="" type="checkbox"/> (1) <input type="checkbox"/> How much carbon dioxide is released ... <input checked="" type="checkbox"/> (1)	2	
			Total	8	

Question	Answer	Mark	Guidance								
3	<table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 50%;">description</th> <th style="text-align: left; width: 50%;">gas</th> </tr> </thead> <tbody> <tr> <td style="border: 1px solid black; padding: 5px;">a gas which is produced in photosynthesis</td> <td rowspan="3" style="border: 1px solid black; padding: 5px;">carbon dioxide</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">a gas which is produced in respiration</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">a greenhouse gas</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">the commonest gas in the atmosphere</td> <td style="border: 1px solid black; padding: 5px;">nitrogen</td> </tr> </tbody> </table>	description	gas	a gas which is produced in photosynthesis	carbon dioxide	a gas which is produced in respiration	a greenhouse gas	the commonest gas in the atmosphere	nitrogen	2	two marks for 3 links correct one mark for 1 or 2 correct
description	gas										
a gas which is produced in photosynthesis	carbon dioxide										
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a greenhouse gas											
the commonest gas in the atmosphere	nitrogen										
Total		2									

Question		Answer	Mark	Guidance
4	a	electromagnetic (1) photons (1) smaller than (1)	3	
	b	Microwaves are absorbed by the food <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> Microwaves make particles vibrate <input checked="" type="checkbox"/> (1) <input type="checkbox"/>	2	

Question		Answer	Mark	Guidance
4	c	<p>no mark for choice of infrared or microwaves</p> <p>correct example of device (linked to choice) (1)</p> <p>idea of the information being sent (1)</p> <p>names receiving device (1)</p>	3	<p>first marking point <u>must</u> correctly link to choice.</p> <p>if choice is missing / other radiation named (eg gamma, UV etc) do not award first marking point, but consider next 2 points with ecf</p> <p>the 2nd marking point needs the candidate to exemplify the information being sent eg text, voice call, picture, sound etc</p> <p>microwaves:</p> <p>expect mobile phone (1)</p> <p>sound/texts/pictures (1)</p> <p>sent from one mobile phone to another (via base stations) (1)</p> <p>other possible applications for microwaves include:</p> <p>satellite TV, (broadcast transmitter, picture/sound signal, satellite dish/TV)</p> <p>wireless networks, (router/modem, any digital media, computer/ipod/kindle etc)</p> <p>Bluetooth, (named Bluetooth device eg ipod etc, any digital media, any 2nd named Bluetooth device),</p> <p>games controller (eg Xbox/Wii controller, move character/shoot etc, Xbox/Wii)</p> <p>IR:</p> <p>expect (TV/open a door) remote control (1)</p> <p>changing something about the TV/radio (turning off/changing the channel) or opening the door (1)</p> <p>TV or door is the receiver / correct nature of the receiver (1)</p> <p>allow direct IR link between 2 mobile phones to exchange information (mobile phone, any digital media, 2nd mobile phone)</p>
		Total	8	

Question			Answer	Mark	Guidance																		
5	a	i	<p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> both Dean and Kate <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </p>	1																			
		ii	<p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> neither of them <input checked="" type="checkbox"/> (1) </p>	1																			
	b		<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;"></th> <th style="width: 10%; text-align: center;">true</th> <th style="width: 10%; text-align: center;">false</th> </tr> </thead> <tbody> <tr> <td>UV can be good for you.</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>UV can damage living cells.</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>UV is a non-ionising radiation.</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td>UV is part of the EM spectrum.</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>UV ... more energetic ... than X-rays.</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </tbody> </table>		true	false	UV can be good for you.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UV can damage living cells.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UV is a non-ionising radiation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	UV is part of the EM spectrum.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	UV ... more energetic ... than X-rays.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2	all correct = 2 marks 4 correct = 1 mark
	true	false																					
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Total				4																			

Question			Answer	Mark	Guidance
6	a	i	2 or 3 (1)	1	accept either 2 or 3 or both
		ii	1 (1)	1	
	b		<div style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> ... causes the production of antibodies ... <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </div>	1	tick in any other box = 0 marks
	c	i	any two from: put off by complications / side effects / autism; think risk of serious complications / death from measles is low; more frightened of autism than measles;	2	the first mark is for identifying a (perceived) risk a candidate clearly expressing the idea that they feel the perceived risk is greater than the benefit scores 2 marks

Question			Answer	Mark	Guidance
6	c	ii	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">description</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">conclusion</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px;"></div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px;"></div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px;">MMR vaccination did not change ...</div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px;"></div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px;"></div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px;"></div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px;"></div> <div style="border: 1px solid black; padding: 5px; width: 150px; height: 40px;">MMR is not linked to autism.</div> </div>	2	<p>first (description) mark for any CLEAR selection of <u>ONLY</u> top left box</p> <p>second (conclusion) mark can <u>ONLY</u> be scored for CLEAR selection of <u>ONLY</u> top left and <u>ONLY</u> bottom right boxes</p>
Total				7	

Question		Answer	Mark	Guidance
7	a	<p>arteries carry blood away from the heart compared to veins which carry blood towards the heart (1)</p> <p>named difference in structure of arteries compared to veins (1)</p> <p>blood pressure in arteries is higher than veins (1)</p>	3	<p>allow comparison in terms of oxygenated/deoxygenated blood, or other correct comparison for their job</p> <p>eg arteries have thicker/more muscular walls / arteries have smaller lumen / veins have valves</p> <p>allow stop backflow of blood in veins if valves given as the structural difference</p>
	b	i	2	<p>answers must be in the correct order</p> <p>all 3 correct = 2 marks 1 or 2 correct = 1 mark</p> <p>the 2 on O₂ can be written as e.g. O₂, O² or O2 allow O for oxygen in first answer space</p> <p>the 2 on CO₂ can be written as eg CO₂, CO² or CO2 allow toxin in second answer space</p> <p>allow either HDL or LDL to mean cholesterol allow reference to types of fat in third answer space</p>
		<p>oxygen / O₂;</p> <p>carbon dioxide / CO₂ / waste;</p> <p>fat / clot / plaque / cholesterol / lipids / fatty deposits</p>		

Question			Answer			Mark	Guidance																		
7	b	ii	<table border="1"> <thead> <tr> <th>life style factor</th> <th>increases</th> <th>decreases</th> </tr> </thead> <tbody> <tr> <td>low-fat diet</td> <td></td> <td>✓</td> </tr> <tr> <td>cigarette smoking</td> <td>✓</td> <td></td> </tr> <tr> <td>moderate aerobic exercise</td> <td></td> <td>✓</td> </tr> <tr> <td>eating five portions of fruit and vegetables a day</td> <td></td> <td>✓</td> </tr> <tr> <td>working long hours in a difficult job</td> <td>✓</td> <td></td> </tr> </tbody> </table>			life style factor	increases	decreases	low-fat diet		✓	cigarette smoking	✓		moderate aerobic exercise		✓	eating five portions of fruit and vegetables a day		✓	working long hours in a difficult job	✓		2	all correct = 2 marks 3 or 4 correct = 1 mark
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