

Applied Science (Double Award)

General Certificate of Secondary Education

Unit **B482/01** Science for the needs of Society

Mark Scheme for June 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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1. Abbreviations, annotations and conventions used in the detailed Mark Scheme.

/	= alternative and acceptable answers for the same marking point
(1)	= separates marking points
not	= answers which are not worthy of credit
reject	= answers which are not worthy of credit
ignore	= statements which are irrelevant
allow	= answers that can be accepted
()	= words which are not essential to gain credit
<u> </u>	= underlined words must be present in answer to score a mark
ecf	= error carried forward
AW	= alternative wording
ora	= or reverse argument

Question		Expected Answers	Marks	Additional Guidance										
1	a	...contain more than one material. <input checked="" type="checkbox"/>contain only synthetic materials.contain layers that are stuck together. <input checked="" type="checkbox"/>are made from stone. ...contain only natural materials.	2											
	b	<table border="0" style="width: 100%;"> <tr> <td style="text-align: center;">work-top</td> <td style="text-align: center;">type of material</td> </tr> <tr> <td style="text-align: center;"><input type="text" value="pottery tiles"/></td> <td style="text-align: center;"><input type="text" value="ceramic"/></td> </tr> <tr> <td style="text-align: center;"><input type="text" value="stainless steel"/></td> <td style="text-align: center;"><input type="text" value="composite"/></td> </tr> <tr> <td></td> <td style="text-align: center;"><input type="text" value="polymer"/></td> </tr> <tr> <td></td> <td style="text-align: center;"><input type="text" value="metal"/></td> </tr> </table>	work-top	type of material	<input type="text" value="pottery tiles"/>	<input type="text" value="ceramic"/>	<input type="text" value="stainless steel"/>	<input type="text" value="composite"/>		<input type="text" value="polymer"/>		<input type="text" value="metal"/>	2	(1) for each correct line do not allow more than one line from each left hand box
work-top	type of material													
<input type="text" value="pottery tiles"/>	<input type="text" value="ceramic"/>													
<input type="text" value="stainless steel"/>	<input type="text" value="composite"/>													
	<input type="text" value="polymer"/>													
	<input type="text" value="metal"/>													
	c	melt / go soft / change shape / more flexible / sticky / shrink; burn / catches fire / give off fumes or gases;	2	allow become malleable ignore 'it turns black' / 'it smokes'										
	d i	liquid; gas;	2	allow (1) for gas and liquid in reverse order.										
	ii	gloves; spray away from skin / keep away from skin / do not touch / keep away from clothes; wash hands after using; spray away from eyes / keep away from eyes/face; keep/store away from children / store in closed cupboard;	2	'wear <u>gloves</u> to keep bleach away from your <u>skin</u> ' = (2) ignore 'harmful to skin' (in the question) ignore 'protect your skin' ignore 'keep it safe' ignore 'wear goggles' / 'protect your eyes' ignore 'protective clothing'										
			10											

Question		Expected Answers	Marks	Additional Guidance										
2	a	<table border="0"> <tr> <td>chemical</td> <td>purpose</td> </tr> <tr> <td>fungicide</td> <td>kills insects that damage crops</td> </tr> <tr> <td>pesticide</td> <td>kills weeds</td> </tr> <tr> <td>fertiliser</td> <td>kills mould</td> </tr> <tr> <td>herbicide</td> <td>provides nutrients</td> </tr> </table>	chemical	purpose	fungicide	kills insects that damage crops	pesticide	kills weeds	fertiliser	kills mould	herbicide	provides nutrients	2	ignore line from fertiliser box (given) all 3 correct = 2 1/2 correct = 1
	chemical	purpose												
	fungicide	kills insects that damage crops												
	pesticide	kills weeds												
	fertiliser	kills mould												
herbicide	provides nutrients													
b	fertiliser	1												
c	cell wall nucleus chloroplast cytoplasm	3	all correct = 3 2/3 correct = 2 1 correct = 1											
d	<table border="0"> <tr> <td>cell part</td> <td>function</td> </tr> <tr> <td>chloroplast</td> <td>supports the cell</td> </tr> <tr> <td>cell wall</td> <td>contains genetic information</td> </tr> <tr> <td>nucleus</td> <td>absorbs light for photosynthesis.</td> </tr> </table>	cell part	function	chloroplast	supports the cell	cell wall	contains genetic information	nucleus	absorbs light for photosynthesis.	2	All correct = 2 1/2 correct = 1			
cell part	function													
chloroplast	supports the cell													
cell wall	contains genetic information													
nucleus	absorbs light for photosynthesis.													
e	only animal manure is used as a fertiliser fields are usually very big most weeds are dug up by hand predators are always used to kill pests more food is grown per acre than for organic farming	<table border="1"> <tr><td>✓</td></tr> <tr><td></td></tr> <tr><td></td></tr> <tr><td>✓</td></tr> </table>	✓			✓	2							
✓														
✓														
			10											

Question			Expected Answers	Marks	Additional Guidance		
3	a	i	<p>gas</p> <p>carbon dioxide</p> <p>oxygen</p> <p>nitrogen</p>	<p>percentage</p> <p>100%</p> <p>78%</p> <p>21%</p> <p>0.03%</p>	3	(1) mark for each correct line	
		ii	carbon dioxide	1			
	b	i	hurricanes	2			
			forest fires;				
		ii	earthquakes;	2	ignore natural disasters e.g. tsunamis / landslides / avalanches / floods etc.		
		volcanoes;					
	c		The Universe is expanding (box 1);	2			
			The Universe started with a big bang (box 4);				
				10			

Question		Expected Answers	Marks	Additional Guidance
4	a	mask has holes in it / mask gets wet / air gets in at the sides idea / not a tight seal idea;	1	
	b	<i>cover nose and mouth advice:</i> (virus) not put into air (by coughing or sneezing) / idea of trapped by hand or tissue / (virus) not breathed in; <i>washing advice:</i> <u>washing</u> gets rid of virus (from hands) / <u>washing</u> kills/destroys virus; <i>burning advice;</i> <u>burning</u> kills/destroys virus;	any 2	ignore 'not spread out' / 'not spread' ignore 'goes on your hands' allow particles / germs / bacteria / microbes / (swine) flu for 'virus' ignore 'disease' 'washing and burning kill/ destroy the virus' = 2 marks ignore 'gets rid of virus' if there is no reference to washing allow (1) for 'virus is destroyed or killed' if there is no reference to how
	c	i	2	
		ii	2	
		iii	2	
		ceramics		
		antibiotics <input checked="" type="checkbox"/>		
		artificial fertilisers		
		beer <input checked="" type="checkbox"/>		
			9	

Question			Expected Answers				Marks	Additional Guidance																				
5	a	i	Fe and hydrogen correct (1) H ₂ SO ₄ (1)				2	do not allow FE do not allow h ₂ SO ₄ , H ² SO ⁴ , H2SO4																				
		ii	<table border="1"> <thead> <tr> <th>chemical</th> <th>element</th> <th>compound</th> <th>mixture</th> </tr> </thead> <tbody> <tr> <td>iron</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>dilute sulfuric acid</td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>iron sulfate solution</td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>H₂</td> <td>✓</td> <td></td> <td></td> </tr> </tbody> </table>				chemical	element	compound	mixture	iron	✓			dilute sulfuric acid			✓	iron sulfate solution			✓	H ₂	✓			2	mark by row all four rows correct = 2 2/3 rows correct = 1 1 row correct = 0
chemical	element	compound	mixture																									
iron	✓																											
dilute sulfuric acid			✓																									
iron sulfate solution			✓																									
H ₂	✓																											
	b	i	cross in first 30s				1	allow cross on 30s																				
		ii	120s / 2 minutes				1	must have units																				
		iii	55				1																					
	c		lower concentration of acid				1	ignore add less acid / add less iron / change temperature / decrease temperature																				
	d		<table border="1"> <tbody> <tr> <td>purification</td> <td>✓</td> </tr> <tr> <td>packaging</td> <td></td> </tr> <tr> <td>quality control</td> <td>✓</td> </tr> <tr> <td>advertising</td> <td></td> </tr> <tr> <td>measurement of dosage per tablet</td> <td>✓</td> </tr> <tr> <td>monitoring factory waste</td> <td></td> </tr> </tbody> </table>				purification	✓	packaging		quality control	✓	advertising		measurement of dosage per tablet	✓	monitoring factory waste		2	3 correct = 2 1 or 2 correct = 1								
purification	✓																											
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measurement of dosage per tablet	✓																											
monitoring factory waste																												
						10																						

Question		Expected Answers	Marks	Additional Guidance	
6	a	reduces energy transfer (4th box)	1		
	b	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>method of heat transfer</p> <p>conduction</p> <p>convection</p> <p>radiation</p> </div> <div style="width: 45%;"> <p>feature of duvet</p> <p>many air gaps</p> <p>surface of duvet is white</p> <p>fibres are long</p> <p>air gaps are small</p> </div> </div>	3	one mark for each correct line.	
	c	i	12.5	1	ignore units
		ii	0.4	1	
	d	i	power = current x voltage	1	allow symbols / allow I, A or C for current, ignore case ignore triangle
		ii	1.2	1	
			W / Watts	1	

Question	Expected Answers	Marks	Additional Guidance
e	<p>any 2</p> <p><i>Idea of heat loss:</i> (14 tog) better insulation / less heat flow / reduces heat escaping;</p> <p><i>Idea of higher temperature difference:</i> bigger temperature difference (in winter)/ colder outside duvet / colder environment;</p> <p>Sleeper's body temperature is the same in summer and winter;</p>	2	<p>allow keeps (some) heat in / less watts lost do not allow <u>stops</u> heat flow ignore 'keeps you warm'</p> <p>ignore colder in winter ignore 'it is colder'</p>
		11	

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