

# **Applied Science (Double Award)**

General Certificate of Secondary Education

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

## **Mark Scheme for January 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.














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	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

Question		Expected Answers	Marks	Additional Guidance
1	(a)	drinking / water (1) eating / food (1)	2	<b>accept</b> 'through the air' ideas / breathing in / coughing / sneezing(1) <b>accept</b> touching objects / example of object e.g. 'money' (1) <b>accept</b> contact with people / touching / through cuts (1) <b>accept</b> faeces / sewage / human waste/ body fluids (1)  <b>ignore</b> 'close to' or 'near' people or objects <b>ignore</b> 'washing hands' / 'washing hands before eating'
	(b)	dead; antibodies; immune	3	
	(c)	(i) kill bacteria / destroy bacteria	1	<b>accept</b> micro-organisms / microbes / germs / fungi <b>do not allow</b> 'get rid of bacteria' / 'fight against the bacteria' <b>do not allow</b> 'kill the disease' <b>ignore</b> references to viruses <b>ignore</b> references to antibodies
		(ii) arteries; capillaries	2	
		(iii) 37°C	1	
	(d)	measles; mumps	2	
<b>Total</b>			<b>11</b>	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	electrons;  protons and neutrons	2	NEED BOTH in either order
	(b) (i)	fractional distillation	1	
	(ii)	13-19; <b>allow</b> value between 60 and 180	2	
	(c) (i)		1	
	(ii)	laboratory safety idea or specific example of safety equipment e.g. goggles / gloves / lab coat / protective clothing / hair tied back / avoid contact with fuels / avoid spills;  do not ignite idea e.g. no flames / do not smoke / no electrical or electronic devices;  use in well-ventilated area / have fire extinguishing equipment available	2	<b>ignore</b> 'use safety equipment' or similar vague answers <b>ignore</b> breathing apparatus / masks  <b>ignore</b> do not use flammable materials

	(d)			can be made from crude oil (✓)	cannot be made from crude oil (✓)	2	all 5 rows correct = 2 marks 4/3 rows correct = 1 mark 2 or 1 rows correct = 0 marks
			plastics	✓			
			salt		✓		
			dyes	✓			
			marble		✓		
			paints	✓			
			<b>Total</b>			<b>10</b>	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> <p><b>electromagnetic radiation</b></p> <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;">visible light</div> <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;">microwaves</div> <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;">infra red</div> </div> <div style="text-align: center;"> <p><b>communication system</b></p> <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;">mobile phones</div> <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;">fibre optics</div> <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;">Speech</div> <div style="border: 1px solid black; padding: 5px; width: 150px; margin: 10px auto;">remote controls</div> </div> </div>	3	if two lines are shown from one box, that line does not score.
	(b)	x-ray    ultraviolet/ UV    micro(wave)	2	3 correct = 2 marks 1/2 correct = 1 mark
	(c)	(i) <b>D</b>	1	
		(ii) number of cycles/waves (1)  in a time/per second (1)	2	<b>ignore</b> 'how often'
		(iii) (wavelength =) radio (1)  (frequency =) gamma (1)	2	<b>allow</b> 1 mark if answers reversed
<b>Total</b>			<b>10</b>	

Question		Expected Answers	Marks	Guidance													
4	(a)	(i)	2	any two <b>ignore</b> temperature increase <b>ignore</b> 'reacts'  <b>do not allow</b> MP2 if reference is made to making air / oxygen or incorrect gas													
					for yeast to grow / for yeast to become active / for yeast to multiply / for fermentation / for respiration;  to produce carbon dioxide / a gas / makes bubbles;  so that bread/dough/mixture rises/gets bigger/expands												
		(ii)	1														
	(b)	<u>yeast</u> needs sugar/ <u>yeast</u> uses sugar for respiration / <u>yeast</u> eats sugar / <u>yeast</u> uses sugar for energy	1	<b>accept</b> 'for the <u>yeast</u> / reacts with the <u>yeast</u> '													
	(c)	(i)	1														
		(ii)	2														
	(d)	<table border="1"> <thead> <tr> <th>statement</th> <th>true for organic farming</th> <th>true for intensive farming</th> </tr> </thead> <tbody> <tr> <td>uses predators to kill pests</td> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td>uses artificial fertiliser</td> <td></td> <td style="text-align: center;">✓</td> </tr> <tr> <td>more food produced on the same land area</td> <td></td> <td style="text-align: center;">✓</td> </tr> </tbody> </table>		statement	true for organic farming	true for intensive farming	uses predators to kill pests	✓		uses artificial fertiliser		✓	more food produced on the same land area		✓	2	fully correct = 2 2 correct = 1 1 correct = 0
statement		true for organic farming	true for intensive farming														
uses predators to kill pests		✓															
uses artificial fertiliser			✓														
more food produced on the same land area		✓															
<b>Total</b>			<b>9</b>														



Question			Expected Answers	Marks	Additional Guidance															
5	(a)	(i)	poly(ethene)	1	<b>accept</b> glue <b>do not allow</b> 'ethene' alone <b>ignore</b> 'gloves' <b>ignore</b> 'wood'															
		(ii)	aluminium	1	<b>do not accept</b> steel															
	(b)		<table border="1"> <thead> <tr> <th></th> <th>true (✓)</th> <th>false (✓)</th> </tr> </thead> <tbody> <tr> <td>all the atoms in a composite are the same</td> <td></td> <td>✓</td> </tr> <tr> <td>one example of a composite is glass reinforced plastic</td> <td>✓</td> <td></td> </tr> <tr> <td>the properties of a composite are a combination of the properties of the materials used to make it</td> <td>✓</td> <td></td> </tr> <tr> <td>materials used to make composites are always arranged in layers</td> <td></td> <td>✓</td> </tr> </tbody> </table>		true (✓)	false (✓)	all the atoms in a composite are the same		✓	one example of a composite is glass reinforced plastic	✓		the properties of a composite are a combination of the properties of the materials used to make it	✓		materials used to make composites are always arranged in layers		✓	2	all correct = 2 marks 2/3 correct = 1 mark 1 correct = 0 marks
	true (✓)	false (✓)																		
all the atoms in a composite are the same		✓																		
one example of a composite is glass reinforced plastic	✓																			
the properties of a composite are a combination of the properties of the materials used to make it	✓																			
materials used to make composites are always arranged in layers		✓																		
	(c)	(i)	<b>any 2 from</b> (ceramic bearings....) do not expand (when hot); less likely to stick; lighter / less dense; do not rust / corrode	2	<b>ignore</b> references to 'friction' / 'get hot' alone  <b>ignore</b> 'erode'  <b>accept</b> reverse argument i.e. <u>steel</u> bearings....															

	(ii)	<p>can be drawn into wires <input type="checkbox"/></p> <p>conduct electricity <input type="checkbox"/></p> <p>do not melt when heated <input checked="" type="checkbox"/></p> <p>flexible <input type="checkbox"/></p> <p>hard <input checked="" type="checkbox"/></p>	1	both required
	(iii)	glass; cement	2	
	(d)	idea of separation (of the components)	1	<b>ignore</b> 'it costs more'
		<b>Total</b>	<b>10</b>	

Question			Expected Answers	Marks	Additional Guidance
6	(a)	(i)	oxygen	1	<b>accept</b> O <sub>2</sub> but <b>ignore</b> O or incorrect formula e.g. O <sup>2</sup> etc
		(ii)	carbon dioxide	1	<b>accept</b> water vapour <b>accept</b> correct formula, <b>ignore</b> incorrect formulae <b>ignore</b> methane / other correct greenhouse gas
		(iii)	nitrogen	1	<b>accept</b> correct formula, <b>ignore</b> incorrect formulae
	(b)		carbon monoxide; sulfur dioxide	2	
	(c)	(i)	increase in carbon dioxide (concentration) / increase in concentration (1)  increase in carbon dioxide (concentration) over the years/ linked to <u>time</u> (2)	2	'it' is not enough for 'carbon dioxide'  <b>ignore</b> 'it goes up and down / zigzags'  'positive correlation' must mention both variables to gain marks.
		(ii)	photosynthesis / plants take in carbon dioxide (1)  idea of different seasons/light levels/temperature (1)	2	<b>assume</b> 'it' refers to carbon dioxide

	(d)		looking at temperature records		1	
			measuring the amount of oxygen and assumed the rest was carbon dioxide			
			examining ice cores	✓		
			examining igneous rocks			
			<b>Total</b>			

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