

# **Applied Science: Double Award**

General Certificate of Secondary Education

Unit **B482/02**: Science for the needs of Society

## **Mark Scheme for June 2011**

---

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support which keep pace with the changing needs of today's society.

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.

© OCR 2011

Any enquiries about publications should be addressed to:

OCR Publications  
PO Box 5050  
Annesley  
NOTTINGHAM  
NG15 0DL

Telephone: 0870 770 6622  
Facsimile: 01223 552610  
E-mail: [publications@ocr.org.uk](mailto:publications@ocr.org.uk)

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

/	=	alternative and acceptable answers for the same marking point
NOT	=	answers which are not worthy of credit
()	=	words which are not essential to gain credit
ecf	=	error carried forward
AW	=	alternative wording
ora	=	or reverse argument

Question			Expected Answers	Marks	Additional Guidance																				
1	a	i	Fe and hydrogen correct (1) H <sub>2</sub> SO <sub>4</sub> (1)	2	do not allow FE do not allow h <sub>2</sub> SO <sub>4</sub> , H <sup>2</sup> SO <sup>4</sup> , 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>H<sub>2</sub></td> <td>✓</td> <td></td> <td></td> </tr> </tbody> </table>	chemical	element	compound	mixture	iron	✓			dilute sulfuric acid			✓	iron sulfate solution			✓	H <sub>2</sub>	✓			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 <sub>2</sub>	✓																								
	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	✓																								
packaging																									
quality control	✓																								
advertising																									
measurement of dosage per tablet	✓																								
monitoring factory waste																									
				10																					

Question		Expected Answers	Marks	Additional Guidance	
2	a	reduces energy transfer (4th box)	1		
	b	<p><b>method of heat transfer</b></p> <p>conduction</p> <p>convection</p> <p>radiation</p> <p><b>feature of duvet</b></p> <p>many air gaps</p> <p>surface of duvet is white</p> <p>fibres are long</p> <p>air gaps are small</p>	3	one mark for each correct line.	
	c	i	12.5	1	<b>Ignore</b> units
		ii	0.4	1	
	d	i	power = current x voltage	1	<b>allow</b> symbols / <b>allow</b> I, A or C for current, ignore case <b>ignore</b> triangle
		ii	1.2 (1) W / Watts (1)	2	

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><b>allow</b> keeps (some) heat in / less watts lost <b>do not allow</b> <u>stops</u> heat flow / <b>ignore</b> 'keeps you warm'</p> <p><b>ignore</b> colder in winter <b>ignore</b> 'it is colder'</p>
			11	

Question			Expected Answers	Marks	Additional Guidance												
3	a	i	D	1													
		ii	B	1													
		iii	prevents blood flowing back / the wrong way	1	no ecf												
		iv	any 2 more muscle stronger (1) one side sends blood to (whole) body / most of the body / most of the organs (1) other side goes to lungs / very different distances / needs more pressure (1)	2	accept different pressures												
		v	circuits deliver blood at high and lower pressure (4 <sup>th</sup> row)	1													
	b		<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; vertical-align: top;"><b>blood vessel</b></td> <td style="text-align: center; vertical-align: top;"><b>adaptations</b></td> <td style="text-align: center; vertical-align: top;"><b>function</b></td> </tr> <tr> <td style="text-align: center; border: 1px solid black; padding: 5px;">artery</td> <td style="text-align: center; border: 1px solid black; padding: 5px;">valves present</td> <td style="text-align: center; border: 1px solid black; padding: 5px;">carries blood under high pressure</td> </tr> <tr> <td style="text-align: center; border: 1px solid black; padding: 5px;">capillary</td> <td style="text-align: center; border: 1px solid black; padding: 5px;">wall is one cell thick</td> <td style="text-align: center; border: 1px solid black; padding: 5px;">is highly permeable</td> </tr> <tr> <td style="text-align: center; border: 1px solid black; padding: 5px;">vein</td> <td style="text-align: center; border: 1px solid black; padding: 5px;">thick muscular and elastic walls</td> <td style="text-align: center; border: 1px solid black; padding: 5px;">carries blood under low pressure</td> </tr> </table>	<b>blood vessel</b>	<b>adaptations</b>	<b>function</b>	artery	valves present	carries blood under high pressure	capillary	wall is one cell thick	is highly permeable	vein	thick muscular and elastic walls	carries blood under low pressure	4	mark each side separately for 2 marks.  3 correct = 2 1/2 correct = 1
<b>blood vessel</b>	<b>adaptations</b>	<b>function</b>															
artery	valves present	carries blood under high pressure															
capillary	wall is one cell thick	is highly permeable															
vein	thick muscular and elastic walls	carries blood under low pressure															
	c		<p>↔;(1)</p> <p>oxyhaemoglobin (1)</p>	2													
				<b>12</b>													

Question			Expected Answers	Marks	Additional Guidance
4	a	i	(the evidence suggest) the continents were touching/joined/were one continent (at some time in the past)	1	<b>accept</b> were connected
		ii	No known forces ... (1 <sup>st</sup> row) Wegener not a geologist (5 <sup>th</sup> row) Continents move too slowly (6 <sup>th</sup> row)	3	
	b	i	any 2 (solid) rock plates/ piece of crust / section the Earths surface;  (the plates) can move;  float on a (solid / liquid) mantle;	2	
		ii	two arrows for motion of plates, both horizontal pointing towards subduction boundary;  gravity – labelled arrow pointing down;  convection current – labeled horizontal arrow(s) pointing towards the subduction zone	1  1  1	<b>accept</b> a correct convection loop unlabelled.
				<b>9</b>	



Question			Expected Answers	Marks	Additional Guidance
5	a	i	more than one material / different materials / named examples of materials in a composite;  bonded / glued / stuck / combined / joined together	2	<b>Allow</b> 'put together'
		ii	improved properties (1) two named properties: stronger; more hardwearing / lasts longer / resists decay; more waterproof; lighter	2	<b>Accept</b> easier to clean  <b>Ignore</b> stain resistant
	b	i	contains cross links / connections/bonds between chains/molecules  polymer chains cannot move	2	
		ii	thermosetting	1	
	c		nitrogen water	2	<b>Allow</b> carbon dioxide or carbon monoxide
	d		both contain long chain molecules / polymers;  melamine contains cross links / the sealant does not	2	Difference must indicate which one has structure being discusses
				<b>11</b>	

Question		Expected Answers	Marks	Additional Guidance
6	a	active transport (1)	1	
		respiration (1)	1	
	b	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>mineral</b></p> <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 5px;">nitrates</div> <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 5px;">magnesium</div> <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 5px;">potassium</div> <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 5px;">phosphates</div> </div> <div style="text-align: center;"> <p><b>function</b></p> <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 5px;">...chlorophyll</div> <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 5px;">....proteins.....</div> <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 5px;">....root growth</div> <div style="border: 1px solid black; padding: 5px; width: 100px; margin: 5px;">....growth and flowering</div> </div> </div>	3	4 correct = 3 marks 3/2 correct = 2 marks 1 correct = 1 mark
	c	any 2 choose an organism(s) with a best/desired characteristic;  idea of cross breeding <u>chosen</u> organisms;  select offspring with desired characteristic;  repeat over many generations	2	<b>accept</b> a named example e.g. fast growing plant <b>ignore</b> selecting genes
			<b>7</b>	

**OCR (Oxford Cambridge and RSA Examinations)**  
**1 Hills Road**  
**Cambridge**  
**CB1 2EU**

**OCR Customer Contact Centre**

**14 – 19 Qualifications (General)**

Telephone: 01223 553998

Facsimile: 01223 552627

Email: [general.qualifications@ocr.org.uk](mailto:general.qualifications@ocr.org.uk)

**[www.ocr.org.uk](http://www.ocr.org.uk)**

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

**Oxford Cambridge and RSA Examinations**  
**is a Company Limited by Guarantee**  
**Registered in England**  
**Registered Office; 1 Hills Road, Cambridge, CB1 2EU**  
**Registered Company Number: 3484466**  
**OCR is an exempt Charity**



**OCR (Oxford Cambridge and RSA Examinations)**  
**Head office**  
**Telephone: 01223 552552**  
**Facsimile: 01223 552553**

© OCR 2011