

# **Applied Science: Double Award**

General Certificate of Secondary Education

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

## **Mark Scheme for January 2013**

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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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## Annotations

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
<b>not/reject</b>	answers which are not worthy of credit
<b>ignore</b>	statements which are irrelevant - applies to neutral answers
<b>allow/accept</b>	answers that can be accepted
(words)	words which are not essential to gain credit
words	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	alternative wording
ORA	or reverse argument
Annotation	Meaning
	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response

Annotation	Meaning
	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

**Subject-specific Marking Instructions**

- a. If a candidate alters his/her response, examiners should accept the alteration.
- b. 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.

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.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 1 mark.

- c. 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.
- d. 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

<b>Edinburgh</b>	
<b>Manchester</b>	
<b>Paris</b>	
<b>Southampton</b>	

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).

<b>Edinburgh</b>			✓			✓	✓	✓	✓	
<b>Manchester</b>	✓	x	✓	✓	✓				✓	
<b>Paris</b>				✓	✓		✓	✓	✓	
<b>Southampton</b>	✓	x		✓		✓	✓		✓	
<b>Score:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>NR</b>

Question			Answer	Marks	Guidance
1	(a)	(i)	idea of movement; plates (tectonic);	2	<b>allow</b> 'continental drift' or 'continents move' for first mark <b>allow</b> 'separate' for 'move' <b>allow</b> 'breaks <u>away</u> ' or 'splits <u>away</u> ' but not 'breaks' or 'splits' alone
		(ii)	mountain/ocean formation	1	<b>reject</b> short term changes eg earthquakes/volcanoes/erosion/environmental effects <b>ignore</b> land formation/sea level change
	(b)		photosynthesis	1	
	(c)	(i)	respiration/breathing/needed for energy (in the body)	1	
		(ii)	greenhouse effect; keeps planet warm/global warming;	2	<b>accept</b> 'plants photosynthesise' for 1 mark only
	(d)	(i)	the Sun; planets/named planet or planets; moons/asteroids/comet/satellites;	2	<b>reject</b> stars/galaxies/black holes <b>ignore</b> Earth <b>ignore</b> space <b>apply the list principle</b>
		(ii)	the 'Big Bang'	1	
<b>Total</b>				<b>10</b>	

Question			Answer	Marks	Guidance
2	(a)	(i)	sugar/glucose	1	
		(ii)	high blood sugar levels/low blood sugar levels/correct blood sugar levels	1	idea of <u>amount</u> <b>NOT</b> <u>levels</u> or level needed of insulin
		(iii)	idea of automatic/no injections; anywhere idea; dose is measured/no errors in measurement; continuous monitoring/immediate treatment;	2	<b>ignore</b> "quicker" alone
	(b)	(i)	pancreas	1	
		(ii)	plasma	1	
		(iii)	insulin is carried in the blood; blood travels more slowly than nerve impulses;	2	box 2 box 4
	(c)		more exercise; eat less sugar/control sugar in food/(change your) diet;	2	
			<b>Total</b>	<b>10</b>	

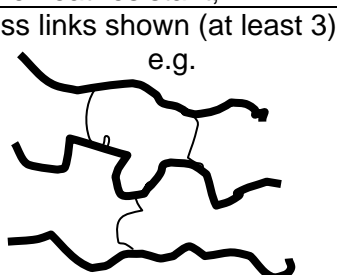


Question			Answer	Marks	Guidance
3	(a)	(i)	sulfur and oxygen	1	both needed
		(ii)	sulfur dioxide/sulfur trioxide/sulfuric acid	1	any 2 for 1 mark
		(iii)	air	1	
	(b)	(i)	2; O <sub>2</sub> ;	2	
		(ii)	oxidation/redox; rate/speed increases; because particles are closer together; increases <u>rate</u> or <u>frequency</u> of collisions/particles more likely to collide; more successful/effective collisions;	4	<b>accept</b> exothermic <b>ignore</b> 'more collisions' alone
	(c)		700 000 tonnes (0.35 X 2 000 000)/(35/100 X 2 000 000)	1	
<b>Total</b>				<b>10</b>	

Question			Answer	Marks	Guidance
4	(a)	(i)	radiation; conduction; convection;	3	
		(ii)	<u>conduction (2)</u> particles vibrate; hot particles vibrate more; collide with cooler particles; pass energy on (from particle to particle); OR (free) electrons; collide with cooler atoms; pass (KE) to other atoms;  <u>convection (2)</u> hot particles move apart; (hot) particles rise; as cool particles fall;	4	idea of <u>amount</u> <b>NOT</b> levels or <u>level</u> needed of insulin  <b>NOT</b> particles expand <b>allow</b> density eg hot fluid has lower density (1) Rises through cooler/less dense fluid (1) ora
	(b)		energy used $\div$ energy in $\times$ 100; 175 000 $\div$ 280 000 $\times$ 100; 62.5;	3	<b>allow</b> 2 marks for 0.625 62.5 gains all 3 marks
<b>Total</b>				<b>10</b>	

Question			Answer	Marks	Guidance
5	(a)	(i)	inherited/passed down; via genes/alleles/chromosomes/in genetic makeup; defective genes/incorrect code; not infectious/cannot catch it;	2	
		(ii)	recessive; dominant; heterozygous;	3	<b>allow</b> one mark if dominant and recessive reversed
	(b)	(i)	<p style="text-align: center;">           mother            F                  f            F    FF    Ff / fF            father            f    Ff / fF    ff         </p>	1	all must be correct
		(ii)	ring around single letter of gametes	1	
		(iii)	meiosis	1	
		(iv)	ff	1	both lowercase
		(v)	25%/1 in 4/0.25/¼	1	
			<b>Total</b>	<b>10</b>	

Question		Answer	Marks	Guidance
6	a	Improved properties; specific examples e.g. lighter; stronger; more durable; more heat resistant;	any 2	do <b>not</b> accept can be shaped, flexible <b>ignore</b> do not rust
	b	i	1	do <b>not</b> allow just tangled
		ii	any 2	
	c	: 2(Mg)      2(MgO)	1	
	d	hard / brittle / thermal insulator / electrical insulator / chemically stable / heat resistant	1	<b>accept</b> fragile
	(e)	(i)	1	
		(ii)	1	
		(iii)	1	
			<b>Paper Total</b>	<b>60</b>



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