



# **Additional Science A**

General Certificate of Secondary Education

Unit A216/02: Modules B5, C5, P5 (Higher Tier)

## Mark Scheme for January 2013

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, 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 2013

## Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning	
/	alternative and acceptable answers for the same marking point	
(1)	separates marking points	
not/reject	answers which are not worthy of credit	
ignore	statements which are irrelevant - applies to neutral answers	
allow/accept	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	credit alternative wording / or words to that effect	
ORA	or reverse argument	

## Available in scoris to annotate scripts:

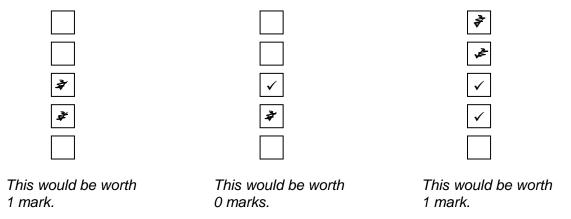
?	indicate uncertainty or ambiguity
BOD	benefit of doubt
CON	contradiction
×	incorrect response
ECF	error carried forward
0	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
NBOD	no benefit of doubt

R	reject
	correct response
2	draw attention to particular part of candidate's response
Δ	information omitted

#### **Subject-specific Marking Instructions**

- a. Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).
- 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.

e.g. for a one-mark question where ticks in the third <u>and</u> fourth boxes are required for the mark:



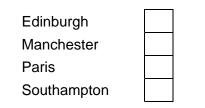
#### c. The list principle:

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, e.g. 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-box questions:

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 and other markings. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses. Credit should be given according to the instructions given in the guidance column for the question. 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.

e.g. if a question requires candidates to identify cities in England:



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).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	×	✓	✓	✓				~	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	×		✓		✓	$\checkmark$		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

- e. For answers marked by levels of response:
  - i. Read through the whole answer from start to finish
  - ii. **Decide the level** that **best fits** the answer match the quality of the answer to the closest level descriptor
  - iii. To determine the mark within the level, consider the following:

Descriptor	Award mark			
A good match to the level descriptor	The higher mark in the level			
Just matches the level descriptor	The lower mark in the level			

iv. Use the L1, L2, L3 annotations in Scoris to show your decision; do not use ticks.

## Mark Scheme

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

Q	uestic	on	Answer	Marks	Guidance
1	(a)		Where is the salt?         Idea of rocks/mountain/ground/lithosphere contain the salt or salts or minerals;         How does (the salt) get into the water?         describes extraction of material from rocks by water eg salt dissolves/chemicals washed out of rocks;         What happens to the sea?         links evaporation to water	3	chemicals not enough for the salt marking point must strongly infer that the salt is in the ground to start with. if ground not mentioned, allow any mention of salt in streams/rivers – assume from ground unless candidate contradicts that assumption. <b>allow</b> rivers pick up salt = salt in ground. <b>allow</b> the water flows over salty ground / rains onto cliffs and picks up salts <b>not</b> salt travels down rivers / rain picks up salt the extraction must be discussed the second marking point will often include the first, and be worth two marks salt washed out of rocks = 2 chemicals washed out of rocks = 1 any context must imply that water evaporates FROM the sea. <b>ignore</b> 'sea evaporates'
	(b)		OR evaporation to salt left behind / salt doesn't evaporate ; Water is made of small molecules.	2	mark each column separately

## Mark Scheme

Question	Answer		Guidance
(c)	CH <sub>4;</sub>	1	
	Total	6	

Q	Question		estion Answer I		Guidance
2	(a)		Е;	1	
	(b)		D;	1	
	(c)		A;	1	
	(d)		В;	1	
			Total	4	

Q	Question		Answer	Marks	Guidance
3	(a)		(electrolyte) is ionic/contains ions/charged particles; (ions) move towards the electrodes; lead ions or positive ions to cathode OR bromide ions or negative ions to anode;	3	particles <u>become</u> charged = CON reject electrons/atoms/molecules/neutrons for first marking point only but allow 'protons' <b>ignore</b> incorrect directions ie 'positive particles to anode' <b>do not allow</b> lead goes to cathode <b>do not allow</b> bromine <b>ignore</b> +ve ions go to –ve ions AND –ve ions go to +ve ions
	(b)		160	1	
			Total	4	

Q	Question		lestion Answer I		Guidance
4	(a)		0.06W;	1	
	(b)		Charge; Temperature;	2	
	(c)		C;	1	
			Total	4	

Q	uestio	n Answer	Marks	Guidance
5	(a)	All three resistors have the same current       ✓         Resistor A          Resistor B          Resistor C	1	
	(b)	electrons move (atoms don't); (electrons) collide with atoms (in the resistor); energy transferred FROM (electrons to atoms) OR MAKES atoms (only) vibrate OWTTE;	3	ignore reference to current ignore 'electrons and atoms collide'
	(c)	12 W	1	
		Total	5	

Q	Question		Answer	Marks	Guidance
6	(a)		X in both left hand boxes Y in both right hand boxes	2	All 4 boxes correct = 2 2 or 3 boxes correct = 1
	(b)		C;	1	
	(c)		36V;	1	
	(d)		0V;	1	
			Total	5	

G	Question		Answer	Marks	Guidance
7	(a)		<b>C</b> ;	1	if no answer given, check the table
	(b)		Meiosis;	3	<b>accept</b> mis-spelling of meiosis (ie but not if a 'T' is present) <b>accept</b> 'reduction division' instead of meiosis
			idea that (gametes have) 39 chromosomes/haploid/half the chromosomes ;		<b>NB</b> unless stated otherwise, assume that the candidate is referring to gametes as the product of cell division
			links (gamete fusion) to zygote/embryo OR (gametes fuse) to give full number/diploid/double the number of chromosomes / (returns to)78 chromosomes;		<ul> <li>allow 'half the genetic information'</li> <li>ignore 'cells/chromosomes split in half'</li> <li>ignore 'gametes double the number of chromosomes'</li> <li>ignore 'half the chromosomes from each parent' in the context of this marking point</li> <li>ignore twice as many chromosomes are produced when the gamete forms</li> <li>reject 78 + 78 chromosomes = 156 (no ecf applied)</li> <li>NB references to fusing and to halving must be in the correct context.</li> </ul>
			Total	4	

Q	Question		Answer	Marks	Guidance
8	(a)		T 35 G 15	1	
	(b)	(i)	amino acids;	1	
		(ii)	Proteins are made in the cytoplasm.	2	
			Total	4	

Q	Question		Answer	Marks	Guidance
9	(a)		meristems; auxins; clones;	3	must be in correct order ' <u>M</u> ice <u>A</u> nd <u>C</u> heese'
			Total	3	

Mark Scheme

Question	Answer		Marks	Guidance	
10	Up to the eight cell stage Specialised cells can Both embryonic and adult Some genes in the nucleus		3	4 correct (3) 3 correct (2) 2 correct (1) 0 or1 correct (0) <b>If more than 4 ticks</b> Each extra tick negates a correct tick	
		Total	3		

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

**OCR Customer Contact Centre** 

#### **Education and Learning**

Telephone: 01223 553998 Facsimile: 01223 552627 Email: general.qualifications@ocr.org.uk

#### 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 2013



