OCR
RECOGNISING ACHIEVEMENT

GCSE

Additional Science A

General Certificate of Secondary Education

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

Mark Scheme for January 2012

Oxford Cambridge and RSA Examinations

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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

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	alternative wording
ORA	or reverse argument

Available in scoris to annotate scripts

	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

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.

E.g.

For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

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, 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 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, e.g. 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.

E.g. If a question requires candidates to identify a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third <u>should be blank</u> (or have indication of choice crossed out).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	×	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	×		✓		✓	✓		✓	
Score:	**2**	**2**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**NR**

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1</td><td>(a)</td><td></td><td>
<table>
<tr><td>electrons</td><td>✓</td><td>are all on one atom.</td><td></td></tr>
<tr><td>ions</td><td></td><td>are shared between two atoms.</td><td>✓</td></tr>
<tr><td>neutrons</td><td></td><td>are spread out between many atoms.</td><td></td></tr>
<tr><td>protons</td><td></td><td>are transferred from one atom to another.</td><td></td></tr>
</table>
</td><td>2</td><td>one mark for each correct column</td></tr>
<tr><td></td><td>(b)</td><td></td><td>
<table>
<tr><td>Rainfall varied over the 4-week period.</td><td></td></tr>
<tr><td>Volcanoes convert sulfur into other…</td><td></td></tr>
<tr><td>Not all processes are shown on the diagram.</td><td>✓</td></tr>
<tr><td>Sulfur dioxide molecules are not as heavy…</td><td></td></tr>
</table>
</td><td>1</td><td></td></tr>
<tr><td></td><td>(c)</td><td></td><td>giant lattice/structure or macromolecular lattice/structure;

covalent bonds;

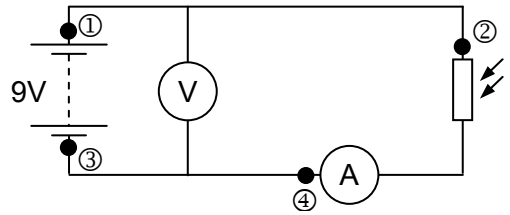
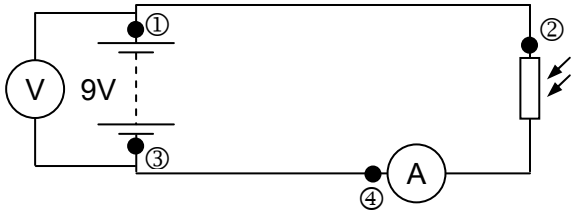
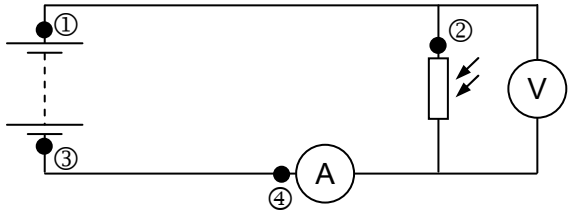
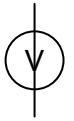
strong bonds or large force/energy needed to break bonds</td><td>3</td><td>accept correct description of giant lattice structure

accept description electrons shared between atoms
reject ionic / intermolecular

accept harder to break the bonds
ignore references to (tight) packing
accept molecules / particles as atoms</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>6</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance
2	(a)		**electrolysis extraction oxidation (reduction)**	1	
	(b)		**48g 56g 64g (112g)**	1	
	(c)		3, 4, 3 (ie $2Fe_2O_3+3C \rightarrow 4Fe+3CO_2$)	2	all three correct = 2 marks any one or two correct = 1 mark
	(d)		copper ✓ magnesium potassium sodium zinc ✓	2	correct pattern of ticks for 2 marks one mistake for 1 mark a mistake is • a tick in the wrong place • an extra tick • a missing tick
			Total	**6**	

Question			Answer	Marks	Guidance
3			negative positive lose electrons atoms Molecules	2	all correct = 2 marks 4 or 5 correct = 1 mark
			Total	**2**	

Question			Answer	Marks	Guidance
4	(a)		 OR 	1	look for a circle with V inside connected to both ends of the battery as shown one terminal must be connected between 1 and 2 one terminal must be connected between 3 and 4 **accept** connected to both ends of the LDR  **accept** freehand straight lines **accept** V on its side or upside down **reject** line through symbol 
	(b)	(i)	45	1	
		(ii)	increases increases decreases	2	all correct for 2 marks (anything), decreases, increases for 1 mark (anything), increases, decreases for 1 mark (anything) can be a blank
			Total	**4**	

Question			Answer	Marks	Guidance
5	(a)		Electrons transfer from the cloth to the rod. ✓ Negative atoms transfer from the cloth to the rod. Positive electrons transfer from the rod to the cloth. The cloth gains a positive charge as it loses electrons. ✓ The rod and cloth both end up with the same negative charge.	2	correct pattern for = 2 one mistake for = 1
	(b)		Bess	1	
			Total	**3**	

Question			Answer	Marks	Guidance
6	(a)		magnetic	1	
	(b)		any three of following for [1] each: • current / charge flow in coil **A** • magnetic field in (iron) ring / coil A / coil B; • voltage / p.d. (induced) across coil **B** • magnetic field increases/changes causes p.d./voltage/current in coil **B**	3	**ignore** alternating / direct (current) **accept** magnetisation / magnet / electromagnet(ic) **accept** (iron) core for ring **ignore** current in coil B **ignore** current in ring/core **ignore** pulses
			Total	**4**	

Question			Answer	Marks	Guidance
7	(a)		1.5	1	
	(b)		current/(flow of) charge/electrons is: • resisted • restricted • reduced • slowed down • limited	1	**ignore** reduces/restricts voltage (from battery) **ignore** reduces push of current **accept** makes it difficult for charge etc **accept** by dissipating energy / heating up **accept** by sharing the voltage/p.d. (from the battery) with the lamp **accept** increases the resistance of the whole circuit
	(c)		18 Ω	1	
			Total	**3**	

Question			Answer	Marks	Guidance
8	(a)		19	1	
	(b)		38	1	
	(c)		Di; Charlie;	2	**accept** in either order 1 mark for each correct name
			Total	**4**	

Question			Answer	Marks	Guidance
9			Red blood cells have a nucleus at an early stage. ✓ Red blood cells make haemoglobin only when they… ✓	2	
			Total	**2**	

Question			Answer	Marks	Guidance
10			any three of the following, [1] each: stem cells • are not specialised • so can become / differentiate into any cell / any tissue / windpipe cells • genes that are active can change / proteins made can change / all genes are able to be switched on / all genes are able to be switched off muscle cells • are specialised; • so cannot become / differentiate into any cell /any tissue / windpipe cells; • activated genes cannot change / proteins made cannot change / some genes are already switched on / some genes are already switched off;	3	**maximum** [2] if only mention one type of cell **assume** 'they/it' refers to stem cells **accept** tissue for cells **accept** switch on and off for change **accept** all genes are able to make proteins **accept** are already differentiated (into muscle cells) / muscle cells can only make more muscle cells **accept** switch on and off for change **accept** only some genes are able to make proteins **ignore** references to rejection
			Total	**3**	

Question			Answer	Marks	Guidance
11			any three of following, for [1] each: • gene / DNA has (a sequence) of bases; • order (of bases) codes for amino acids / protein • copy of gene transferred to cytoplasm/ribosome; • amino acids joined to make protein;	3	**accept** all four of A, T, G and C as alternative to bases **accept** triplets of bases (e.g. CCG) as order of bases **accept** DNA transcribed to RNA/mRNA **accept** RNA/mRNA translated to protein **accept** polypeptide as protein throughout
			Total	**3**	

Question			Answer	Marks	Guidance
12			auxin shaded longer	2	3 correct = 2 marks 2 correct = 1 mark
			Total	**2**	

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