OCR
RECOGNISING ACHIEVEMENT

GCSE

Additional Science A

General Certificate of Secondary Education

Unit **A216/01:** Modules B5, C5, P5 (Foundation Tier)

Mark Scheme for June 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.

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	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
	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
	draw attention to particular part of candidate's response
^	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:

This would be worth 1 mark.

This would be worth 0 marks.

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-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:

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**

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.

   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.

<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>oxygen in correct box (1)
nitrogen in correct box (1)</td><td>2</td><td>both gases named but in wrong place = 1 mark</td></tr>
<tr><td></td><td>(b)</td><td></td><td><table><tr><td></td><td>argon</td><td>carbon dioxide</td></tr><tr><td>symbol or formula</td><td>Ar</td><td>CO_2</td></tr></table></td><td>2</td><td>1 mark for each:
the ‘r’ of ‘Ar’ must be smaller than the ‘A’ and lower case
the letter ‘C’ and ‘O’ in ‘CO_2’ must be of a similar size
subscripts are essential, but accept any indication that the subscript is intended in each case</td></tr>
<tr><td></td><td>(c)</td><td></td><td>any three from:
small [molecules] (1)
weak [forces] (1)
easier to separate (1)
less energy to separate (1)</td><td>3</td><td>don’t accept “no force”
don’t allow “break apart”</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>7</td><td></td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>2</td><td>(a)</td><td></td><td>first point (1)
second point (1)
any further detail for (1)
note: a mark must be given in the first column before the explanation mark can be given</td><td>3</td><td>
<table>
<tr><th>any two from:
(for two marks maximum)</th><th>explanation linked to danger
(for 1 mark maximum)</th></tr>
<tr><td>falling down the mine;</td><td rowspan="3">causing injury/trapping person;</td></tr>
<tr><td>basket falling on miners;</td></tr>
<tr><td>soils/sides of shaft might collapse;</td></tr>
<tr><td>(lead ore)dust is harmful (if breathed in for a long time);</td><td>as the ore is broken/ dug out /AW; not mined</td></tr>
<tr><td>(lead)fumes are harmful (if breathed in for a long time);</td><td rowspan="2">from the fire/ when the lead is melted / heated OR lead ore is burned /heated/melted.
not burning lead</td></tr>
<tr><td>sulfur dioxide causes breathing problems</td></tr>
<tr><td>molten lead is hot;</td><td>risk of burns</td></tr>
</table>
ignore references to acid rain/environment / less oxygen /food</td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>s
s
g</td><td>1</td><td>all symbols correct for 1 mark</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>lead oxide + carbon ➔ lead + carbon dioxide

accept

lead oxide + carbon ➔ lead + carbon monoxide</td><td>1</td><td>reactants may be in either order
products may be in either order
check the ‘ide’ endings are correct

ignore symbol equation</td></tr>
<tr><td></td><td></td><td>(iii)</td><td>
<table>
<tr><td></td><td></td></tr>
<tr><td>It is not very reactive.</td><td>✓</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
</table>
</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>(iv)</td><td>reduction</td><td>1</td><td>accept redox
ignore deoxygenation</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>7</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance
3	(a)		40(Ω)	1	
	(b)		*any three from*: current in resistor will be 0.07 A / the same; (1) because it has 2.8 V / same voltage / same battery across it; (1) ammeter current is sum of resistor currents / current = 0.07 × number of resistors / when you add a resistor current increases by 0.07 (1) (increasing resistors) increases paths for current; (1) (so) reduces total resistance / total resistance smaller than resistance of individual resistor (1)	3	**allow** charge / electron flow for current **allow** p.d./ potential difference for voltage **accept** current proportional to number of resistors **ignore** current *increases* with number of resistors **accept** less difficult for current to pass through
			Total	**4**	

Question			Answer	Marks	Guidance
4	(a)		230 V a.c.	1	
	(b)		generator magnet electromagnetic	2	all three correct for [2] any two correct for [1]
	(c)		Reduce the diameter of the coil. [ ] Replace all the iron with copper. [ ] Make the turbine spin round faster. [✓] Decrease the weight by ... [ ] Increase the number of turns of .... [✓]	2	correct pattern for [2] one mistake for [1]
			Total	**5**	

Question			Answer	Marks	Guidance
5	(a)		0.12×24	1	
	(b)		180 p	1	**allow** £1.80 but not 1.80 only (no £) unless working shows 180
	(c)		The joule is too small a unit of energy. ✓ Only heat energy is measured in joules. One joule is the same as a kilowatt-hour.	1	
	(d)		$\frac{0.12}{2.40} \times 100$	1	
	(e)		voltage	1	
			Total	**5**	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>6</td><td>(a)</td><td>(i)</td><td>nucleus</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td>cytoplasm</td><td>1</td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td><table><tr><td>DNA is cut up into lengths of protein.</td><td></td></tr><tr><td>A copy of the DNA is carried to where proteins are made.</td><td>✓</td></tr><tr><td>Parts of the protein are made next to the DNA then taken away to be put together.</td><td></td></tr><tr><td>DNA is changed into amino acids, which then move around the cell.</td><td></td></tr></table></td><td>1</td><td></td></tr>
<tr><td></td><td>(c)</td><td></td><td>DNA strand
chromosomes
DNA strands</td><td>2</td><td>3 correct = 2 marks
2 correct = 1 mark</td></tr>
<tr><td></td><td>(d)</td><td></td><td><table><tr><td>Each parent cell produces four new cells.</td><td></td></tr><tr><td>The new cells are genetically different from each other.</td><td></td></tr><tr><td>The new cells are genetically identical to the parent cell.</td><td>✓</td></tr><tr><td>The parent cell has more genes than the new cells.</td><td></td></tr></table></td><td>1</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>6</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance
7	(a)		**DCAB**	2	**D** anywhere before **C**; **C** anywhere before **A**; **A** anywhere before **B**; 3 correct = 2 marks 2 correct = 1 mark
	(b)		74	1	
			Total	**3**	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>8</td><td>(a)</td><td></td><td>any three from:

meristems are unspecialised/ contain unspecialised cells; (1)

meristems can still divide / undergo mitosis; (1)

plants have meristems / unspecialised cells/unspecialised tissues
OR animals don’t have meristems / unspecialised cells; (1)

plants keep growing / animals stop growing; (1)

plants can regrow new parts (when damaged) /be cloned / regrow new organs or tissues; (1)</td><td>3</td><td>don’t allow idea of “whole plant is unspecialised”

accept trees grow from the tips whereas animals grow over whole of their body
accept named examples of organs such as roots, leaves or tissues such as xylem and phloem</td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>phototropism</td><td>1</td><td>accept positive phototropism
do not accept negative phototropism or wrong tropism (eg geotropism) or just tropism</td></tr>
<tr><td></td><td></td><td>(ii)</td><td><table><tr><td>allows plants to get more water</td><td></td></tr><tr><td>allows plants to make more sugars</td><td>✓</td></tr><tr><td>allows plants to get more air</td><td></td></tr></table></td><td>1</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>5</td><td></td></tr>
</table>

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