RECOGNISING ACHIEVEMENT

GCSE

Additional Science A

General Certificate of Secondary Education

Unit **A152/01:** Modules B5, C5, P5 (Foundation 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.

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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.

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
NBOD	no benefit of doubt

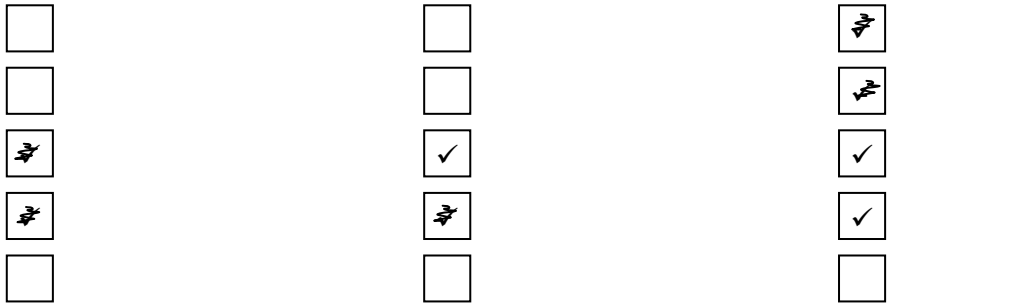
R	reject
✓	correct response
L1 , L2 , L3	indicate level awarded for a question marked by level of response
^	information omitted

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 and 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:

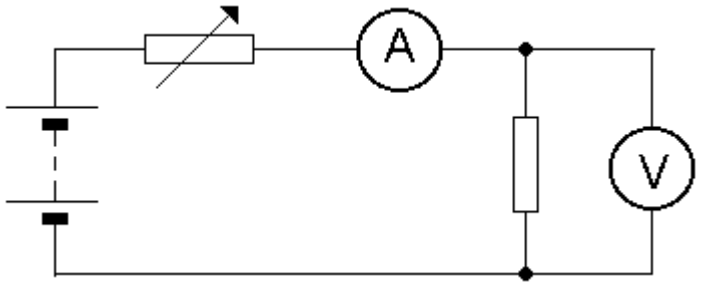
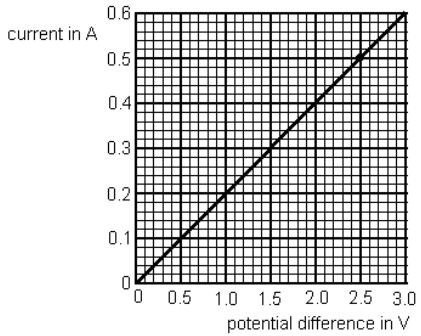
- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

Question			Answer	Marks	Guidance
1	(a)		CO_2 (1) H_2O (1)	2	subscripts by eye
	(b)		Silicon dioxide is present in ... Earth's crust ✓ Silicon dioxide has a high melting point All minerals are made of silicon dioxide Silicon dioxide is only found in Iceland	1	
	(c)	(i)	340,000 (tonnes) (2) (compares with) 150,000 / use 190,000 (more) (1)	3	if 340,000 tonnes not given, look for 17,000x20 for 1 mark **ignore** "it is true"

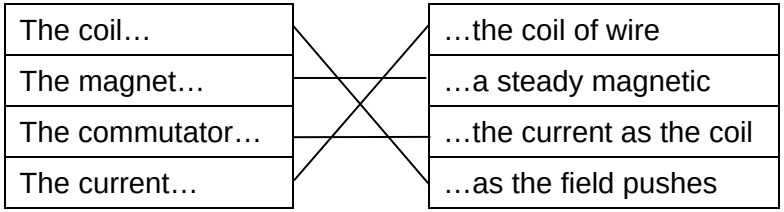
Question			Answer	Marks	Guidance
1	(c)	(ii)	**[Level 3] (5–6 marks)** Candidate identifies more than one of the issues and gives a plausible rationale to explain at least two of them. Quality of written communication does not impede communication of the science at this level. **[Level 2] (3–4 marks)** Candidate identifies at least one issue and offers an explanation for it, possibly superficial. Quality of written communication partially impedes communication of the science at this level. **[Level 1] (1–2 marks)** Candidate identifies issues and makes links to accuracy. Quality of written communication impedes communication of the science at this level. **[Level 0] (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to E** **Indicative scientific points may include:** NB There is no 'right' answer to the 'most accurate' part. qualifying terms in the text that are **issues** : 'think', 'about', 'on average' **Relevant points include** • difficulty of estimating output of volcano BECAUSE it is too dangerous • difficulty of estimating output of volcano BECAUSE CO_2 is already in the air • 17,000 appears to be a rounded number BECAUSE it varies from day to day • 17,000 appears to be a rounded number BECAUSE only flights from major airports/filed with air traffic control centres will have been counted • amount of carbon dioxide produced per flight varies BECAUSE of factors such as – size/mass of plane – distance of flight – how modern the plane is. • trustworthiness of some internet sites BECAUSE lies are told on the internet. **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**

Question			Answer	Marks	Guidance
1	(d)		**any two from:** oxygen (**also** present in reactants) identified ; oxygen now included in products / oxygen ALSO reacts/is added ; atoms conserved ;	2	**ignore** responses that list several chemicals, **do not credit** answers with oxygen in the wrong context eg as a product
	(e)		**Idea of multiple bonds** (1) mentions giant structure / lattice [of any type] / large number of bonds **Idea of difficult of breaking the structure** (1) covalent / strong / difficult to break	2	**ignore** tightly packed **accept** a reference to diamond for first marking point. Any mention of **ions/ionic** means that only the **first** marking point is available. “it is a strong ionic structure” = 0 ie both the same marking point “it is an ionic lattice/giant structure” = 1 “It is a covalent lattice/ giant structure” = 2
			Total	**16**	

Question			Answer	Marks	Guidance
2	(a)		electrolysis	1	
	(b)		better than (1) the negative electrode (1) oxygen gas is formed (1)	3	
			Total	**4**	

Question			Answer	Marks	Guidance
3	(a)			2	one mark for each allow swapped round for (1) accept **a** and **v** instead of **A** or **V**
	(b)	(i)		1	look for straight line through origin and marked point
		(ii)	calculation of resistance as 5.0 Ω (1) not same as 4.7 Ω (1)	2	**accept** about the same value **accept** any valid comment from incorrectly calculated answer
	(c)	(i)	**any one of the following:** • meter readings incorrect • meter readings not precise enough • change of environment eg temperature • change of/different equipment • meters may not be accurate enough. • Named human error	1	**accept** explicit experimental errors eg resistor still warm, circuit wired up wrongly, different equipment, but treat generic "experimental errors/did it differently" type comments as neutral **do not credit** outlier (it is the same resistor) **accept** "read meter wrongly", "calculated wrongly"

Question			Answer	Marks	Guidance
3	(c)	(ii)	make more measurements (1) average them (1)	2	
			Total	**8**	

Question			Answer	Marks	Guidance
4				3	correct pattern for (3) one or two mistake for (2) three mistakes for (1)
			Total	**3**	

Question			Answer	Marks	Guidance
5	(a)		920 W (1)	1	
	(b)		**either** current (= 6 × 0.5) = 3.0 A **or** power (= 6 × 230 × 0.5) = 690 W **then** less than maximum, so OK	2	**accept** valid conclusion from incorrect calculation, e.g. 0.5 A< 4 A
			Total	**3**	

Question			Answer	Marks	Guidance
6			**[Level 3] (5–6 marks)** Discusses charge transfer, though with some errors, and goes on to correctly explain one of the effects. Quality of written communication does not impede communication of the science at this level. **[Level 2] (3–4 marks)** Correctly explains one of the effects in an electrical context, or discusses charge transfer, possibly incorrectly **OR** discusses charge transfer and gives a **very** poor explanation of one of the electrical phenomena. Quality of written communication partly impedes communication of the science at this level. **[Level 1] (1–2 marks)** Realises that it is a charge phenomenon or attempts to explain an electrical phenomenon. Quality of written communication impedes communication of the science at this level. **[Level 0] (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to C** **Indicative scientific points may include:** **Charge transfer** • friction/rubbing transfers electrons between materials • electrons have negative charge • atoms which lose electrons have positive charge • atoms which gain electrons have negative charge • balloon and hair must/can be insulators • so that electrons can't flow easily through them **Hair sticks to balloon** • balloon and hair have opposite charge • so attract (and stick to each other) **Hair stands on end** • hairs have the same charge • so repel each other (and stand on end) **Hair slowly goes down** • hairs lose their charge slowly [ignore charge runs out] • hair must be a conductor **ignore** static energy **accept** static for charge at level 1 and 2 **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**6**	

Question			Answer	Marks	Guidance
7	(a)		double four order	2	3 correct = 2 marks 2 correct = 1 mark 1 or 0 correct = 0 marks
	(b)		bases ☐ carbohydrates ☐ fats ☐ protiens ✓	1	
	(c)		nucleus (1) cytoplasm (1)	2	responses **must** be in this order
			Total	**5**	

Question			Answer	Marks	Guidance
8	(a)		unspecialised all some	2	3 correct = 2 marks 2 correct = 1 mark 1 or 0 correct = 0 marks
	(b)		Tom (1) nothing is risk free / 100% safe (1)	2	treat as independent marking points
	(c)		Any argument that shows that this one case is not representative (no) because a single case does not provide good evidence for or against a correlation	1	result may not be representative / may be outweighed by a large number of positives / might be an outlier **accept** “there is **only** one result” / “not enough evidence” / that animal was sick **ignore** differences between animals and humans
			Total	**5**	

Question			Answer	Marks	Guidance
9	(a)		points correctly plotted (1) curved line of best fit (1)	2	
	(b)		the **stem** is not growing in the first week (1) but the root is growing / OVERALL the plant is growing (1)	2	"Plant is not growing" is in the question, it needs "the STEM not growing" idea eg "it was 15 in the first 2 weeks" Needs OVERALL idea otherwise the question makes no sense.
			Total	**4**	

Question			Answer	Marks	Guidance
10			**Level 3 (5–6 marks)** Explains why sperm only needs half a set of chromosomes but skin needs full set, and uses mitosis, meiosis correctly eg sperm count has to complement egg chromosome number. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** Identifies chromosomes numbers (or ratio of "half") for both OR correct explanation involving one cell only. Quality of written communication partially impedes communication of the science at this level. **Level 1 (1–2 marks)** Links cells' role to question OR makes a relevant comment about either cell. Quality of written communication impedes communication of the science at this level. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to D** **Relevant points include:** • skin cells form by mitosis • mitosis produces two cells with the same number of chromosomes as the parent cell • sperm cells form by meiosis • meiosis produces cells with half the number of chromosomes of parent cell • sperm cells need to have half number of chromosomes to join with half from egg cell to make new individual with full set. **accept** 46 chromosomes or 23 pairs for full chromosome number accept 23 chromosomes for sperm **reject** 46 or 23 pairs of chromosomes in sperm cells Accept role of cell division for skin cells is to make a clone/identical Accept role of cell division for sperm cells is to join with an egg cell (AW baby get other half from mother idea) **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**6**	

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