RECOGNISING ACHIEVEMENT

GCSE

Additional Science A

General Certificate of Secondary Education

Unit **A217/02:** Modules B6, C6, P6 (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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OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

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:

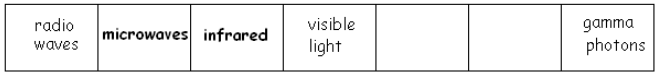
Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

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.

Question			Answer	Marks	Guidance
1	(a)	(i)	$\frac{1}{4 \times 0.001}$	1	
		(ii)	stays the same; decreases;	1	both correct for (1)
	(b)		They carry matter with them ... ☐ They don't have any effect ... ☐ They make matter move from side ... ☐ They make matter move backwards ... ✓	1	
	(c)		sound; empty space;	1	both correct for (1)
			Total	**4**	

Question			Answer	Marks	Guidance
2	(a)		frequency	1	**accept** photon energy, wave frequency
	(b)			1	both correct for (1) **ignore** ultraviolet / UV or X-ray in the other boxes
	(c)		*any three from:* microwaves reflect off walls of oven; (1) interference happens where waves meet/overlap/arrive together; (1) if out of step / in antiphase; (1) will cancel out / have zero amplitude / destructive interference; (1) so no energy transferred to food (as heat) at that point; (1) rotation ensures that no part of food stays at point of destructive interference; (1)	3	**accept** annotated diagram **accept** alternative answers using waves in step giving constructive interference transferring lots of energy **not** cooking the food **not just** rotation allows even cooking
			Total	**5**	

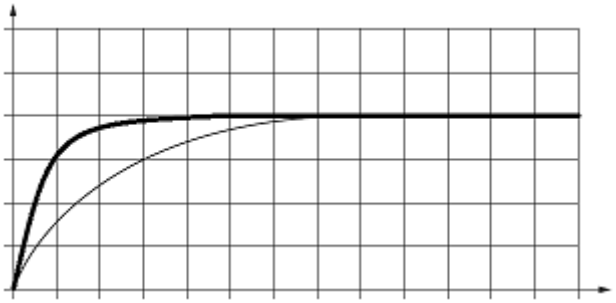
Question			Answer	Marks	Guidance
3	(a)		modulate(d)	1	**accept** phonetic spelling
	(b)		Radio waves are not absorbed by air. ✓ Radio waves reflect off objects in ... ☐ Radio waves diffract out of aerials ... ☐ Radio waves are absorbed at the ... ☐	1	
	(c)		*any three from:* (digital transmitter) sends out a signal of 1s and 0s; (1) signal degraded by noise/interference as it travels; (1) decoder/receiver recreates/restores original signal; (1) analogue receiver cannot remove noise; (1)	3	**accept** on and off as 0 and 1, binary code,  **accept** noise changes shape of wave **accept** decoder removes the noise / cleans signal / makes signal clearer **look for** indication that signal is processed in a receiver **ignore** digital signals don't pick up noise (as they travel)
			Total	**5**	

Question			Answer	Marks	Guidance
4	(a)		*any three from:* no conscious thought / no use of brain / without thinking / automatic response / involuntary response; (1) neurons carry (electrical) impulses; (1) impulses go from sensor/receptor to effector ; (1) through relay neuron / link neuron; (1) (insulating) fatty sheath gives faster impulses; (1)	3	**accept** electrical signal as impulse **accept** sensory /receptor neuron as start of pathway and motor neuron as end of pathway **not** brain, **accept** interneuron as relay neuron **ignore** references to heat insulation / protection
	(b)		muscle cells ✓ skin cells retina cells hormone secreting cells ✓ cerebral cortex cells	1	both needed for the mark
			Total	**4**	

Question			Answer	Marks	Guidance
5	(a)		finding food ✓ growing ☐ communicating ☐ remembering ☐ reproducing ✓	1	
	(b)		has a complex brain pathways cerebral cortex	2	3 correct = 2 marks 2 correct = 1 mark
	(c)	(i)	long term (memory)	1	
		(ii)	☐ Danny's brain links the smell of sea air…… ✓ ☐ ☐ ☐	1	
			Total	**5**	

Question			Answer	Marks	Guidance
6	(a)		B H F	2	BHF in any order = 1 mark getting BHF in correct order = second mark **remember b**udgies **h**ate **f**oxes
	(b)		The drug blocks receptor sites at synapses. ✓ Amy's brain forms new neuron pathways. ✓ Amy's brain has some neuron pathways that are more likely to transmit impulses than other neuron pathways. ✓	1	1 mark for each correct tick
	(c)			2	1 mark for each correct tick
			Total	**5**	

Question			Answer	Marks	Guidance
7	(a)	(i)	calcium chloride / $CaCl_2$	1	look for correct capitals and subscripts in formula i.e. at least half size
		(ii)	2 $CaCl_2$+ H_2O + CO_2	2	LHS correct RHS correct (any order) look for correct use of subscripts i.e. at least half full size look for correct use of capital letters **ignore** arrow drawn over equals sign
	(b)		H^+ / hydrogen (ion) / (positive) hydrogen (ion) / hydrogen$^+$ / proton	1	look for correct superscript e.g. above cross-bar of H
			Total	**4**	

Question			Answer	Marks	Guidance
8	(a)	(i)	65+32+(16 x 4) =161	2	if final answer incorrect, award (1) for correct working e.g. 65 + 32 + 64 (in any order) 65 + 32 + (16 x 4) 65 + 32 + 16 x 4 65 + 32 + 16 + 16 + 16 + 16 correct answer (even without working) for (2)
		(ii)	161	1	if incorrect, then look for same answer as (a)(i) for (1)
	(b)		more acid particles per cm^3 more collisions per second	2	more than two boxes connected award (0)
	(c)		line starting at the origin (by eye) and rising more steeply; reaching same vertical level;	1 1	**accept** two straight lines **look for** something like this: 
	(d)		*any three from:* reaction could be too fast / too slow; (1) too fast could result in loss of control / danger / explosion; (1) too slow could result in less product / longer time; (1) reduces profits / makes less money / more expensive; (1)	3	
			Total	**10**	

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

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Facsimile: 01223 552553