OCR
RECOGNISING ACHIEVEMENT

GCSE

Science A

General Certificate of Secondary Education

Unit **A213/02:** Unit 3: Modules B3, C3, P3 (Higher 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.

Any enquiries about publications should be addressed to:

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:

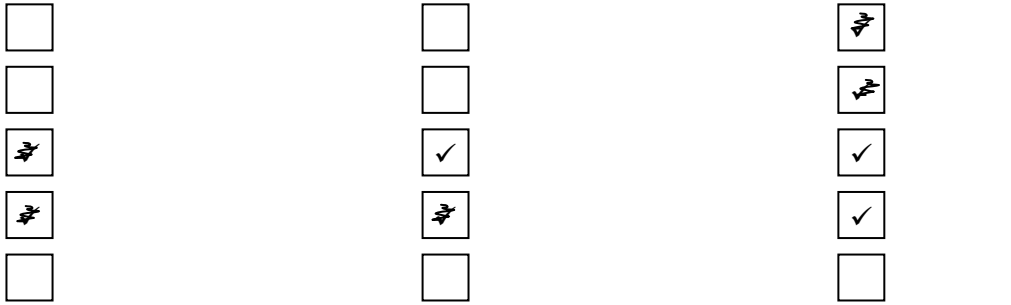
	indicate uncertainty or ambiguity
BOD	benefit of doubt
CON	contradiction
	incorrect response
ECF	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
NBOD	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	Mark	Guidance
1	(a)		The amount of radiation decreases with time. ✓ The emitted radiation is an ionising radiation. ✓	2	**accept** any unambiguous correct indication of response
	(b)		Diseased cells may be killed. ✓ The patient is contaminated by the injected material. ✓	2	**accept** any unambiguous correct indication of response
	(c)		*any three from:* success rate / chance of being cured; (1) risks; (1) risk of not treating illness; (1) any changes of lifestyle resulting from treatment; (1) risks to others from radioactive material; (1) how long the material stays in the body / stays radioactive; (1) alternative treatments; (1)	3	**ignore** details about patient's health e.g. (short term) side effects / (long term) dangers / risks of treatment / harm from treatment/ benefits outweighs risk/ sickness / effects on the body / increased cancer risk/ example of risk; e.g. inability to work (due to tiredness); recovery time e.g. avoiding close proximity; danger to unborn child
			Total	**7**	

Question			Answer	Mark	Guidance
2	(a)		3	1	
	(b)	(i)	35	1	
		(ii)	none of the above	1	
			Total	**3**	

Question			Answer	Mark	Guidance
3	(a)		total energy input (18+190+18+374+300) = 900 calculation of percentage 190×100%/900 = 21%	2	no mark for conclusion that the statement is correct or not **accept** backward calculation for 2 marks: 20% of 900 = 180 21/21.1% gets 2 marks
	(b)		68	1	
	(c)		<table><tr><td></td><td>fits</td><td>doesn't</td></tr><tr><td>Nuclear</td><td>✓</td><td></td></tr><tr><td>Fossil fuel</td><td></td><td>✓</td></tr><tr><td>Total power station</td><td></td><td>✓</td></tr></table>	1	
			Total	**4**	

Question			Answer	Mark	Guidance
4	(a)		leaves → worm → blackbird → hawk	1	all correct for 1 mark
	(b)		*any three from:* the environment changes / example of change; (1) human activity/influence / example; (1) idea of competing for resources; (1) new predator / example; (1) disease / example; (1) not enough food/water / example; (1)	3	**accept** idea of either global or local extinction e.g. climate change; flooding; habitat destruction e.g. hunting; e.g. competitor, competition for food / water / light; **allow** explosion in predator population **ignore** ideas about evolution
	(c)		<table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Meeting the needs of people today.</td><td>✓</td></tr></table>	1	
			Total	**5**	

Question			Answer	Mark	Guidance
5	(a)		Charles	1	
	(b)		<table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Some humans had a larger brain.</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>	1	more than 1 tick = 0
	(c)		*any one from:* creativity required; (1) may be more than one interpretation of the data; (1) hard to believe; (1) people very set in their ways; (1) not enough evidence/proof; (1) no mechanism; (1) incomplete fossil record; (1)	1	**do not accept** "no evidence"
			Total	**3**	

Question			Answer	Mark	Guidance
6	(a)		nervous — electrical impulses — fast — disappears quickly hormonal — chemical — slow — long time	1	both lines correct = 1 mark
	(b)		<table><tr><th>responses</th><th>nervous</th><th>hormonal</th></tr><tr><td>changes at puberty</td><td></td><td>✓</td></tr><tr><td>controlling blood sugar</td><td></td><td>✓</td></tr><tr><td>pupil response to bright light</td><td>✓</td><td></td></tr><tr><td>waving to a friend</td><td>✓</td><td></td></tr><tr><td>dropping a hot plate</td><td>✓</td><td></td></tr></table>	2	5 correct = 2 marks 4 correct = 1 mark
			Total	**3**	

Question			Answer	Mark	Guidance
7			*any three from:* idea that mutation is passed on through reproduction; (1) (DNA change) may produce new characteristics; (1) links change in characteristics or change in DNA to either organism's response to environment or environmental change; (1) ref. to natural selection / survival of the fittest; (1) explanations of what a species is ie not interbreeding to produce fertile offspring (1)	3	e.g. giraffes' necks became longer to suit environment / horses' limbs changing in response to changing ground conditions / general statement e.g. "mistake in DNA may suit the environment more"
			Total	**3**	

Question			Answer	Mark	Guidance
8	(a)		animal waste is recycled / renewable; discussion of need to manufacture or transport synthetic fertilisers sustainable maintenance of soil quality / humus content etc; statement of what sustainability is	2	**ignore** reference to pollution **ignore** animal waste will not run out **ignore** synthetic fertilisers are man made owtte e.g. non-renewable resources needed for fuel for transport or manufacturing; energy needed to make synthetic fertilisers e.g. soil structure will improve when manure added e.g. no non-renewable resources are used up; Earth left in the same condition for future generations
	(b)	(i)	C AF (in order, next to each other)	2	CAF – 2 marks **allow** AFC for 2 marks ACF – 1 mark (for C) AFX and XAF – 1 mark (for AF) AXF – 0 marks
		(ii)	cost implications; yield / effectiveness; health and safety (for farm workers, not consumers); ease of application (e.g. man power, handling); relevant environmental factor other than sustainability (e.g. run off, eutrophication)	3	2 factors (2 marks) + explanation / more detail for one of the factors (1 mark) **ignore** speed **ignore** supply **allow** type of crop **ignore** statements that confuse pesticides and fertilisers candidates do not need to know details of manure and/or fertiliser (e.g. which is more expensive, easier to spread etc)
			Total	**7**	

Question			Answer	Mark	Guidance
9	(a)		biscuits contain starch which is digested to glucose (1) sugar can be absorbed directly into the blood (1)	2	
	(b)		3; (1) 4; (1)	2	either order
			Total	**4**	

Question			Answer	Mark	Guidance
10			protein(s)/polypeptides; (1) urea; (1) urine; (1)	3	**accept** urea for urine
			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

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Head office
Telephone: 01223 552552
Facsimile: 01223 552553