

Additional Science A

General Certificate of Secondary Education

Unit **A217/01**: Modules B6, C6, P6 (Foundation Tier)

Mark Scheme for June 2012

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, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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.

© OCR 2012

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 |
| <u>words</u> | 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 |
|  | 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. 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.

eg 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, eg 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, eg 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.

eg 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 should be blank (or have indication of choice crossed out).

| | | | | | | | | | | |
|---------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Edinburgh | | | ✓ | | | ✓ | ✓ | ✓ | ✓ | |
| Manchester | ✓ | x | ✓ | ✓ | ✓ | | | | ✓ | |
| Paris | | | | ✓ | ✓ | | ✓ | ✓ | ✓ | |
| Southampton | ✓ | x | | ✓ | | ✓ | ✓ | | ✓ | |
| 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 | more than one answer circled equals no marks | | | | | | | | |
| | | (ii) | stays the same; decreases; | 1 | both correct for (1) | | | | | | | | |
| | (b) | | <table border="1"> <tr> <td>They carry matter with them ...</td> <td></td> </tr> <tr> <td>They don't have any effect ...</td> <td></td> </tr> <tr> <td>They make matter move from side ...</td> <td></td> </tr> <tr> <td>They make matter move backwards ...</td> <td>✓</td> </tr> </table> | They carry matter with them ... | | They don't have any effect ... | | They make matter move from side ... | | They make matter move backwards ... | ✓ | 1 | accept any indication of correct box if more than one box indicated, no marks |
| They carry matter with them ... | | | | | | | | | | | | | |
| They don't have any effect ... | | | | | | | | | | | | | |
| They make matter move from side ... | | | | | | | | | | | | | |
| They make matter move backwards ... | ✓ | | | | | | | | | | | | |
| | (c) | | sound; empty space; | 1 | both correct for (1) | | | | | | | | |
| Total | | | | 4 | | | | | | | | | |

| Question | | | Answer | Marks | Guidance | | | | | | |
|--------------|-------------------|--|---|-------------|---|--|---------------|--|---------------|---|---|
| 2 | (a) | | frequency | 1 | more than one answer circled equals no marks | | | | | | |
| | (b) | | <table border="1"> <tr> <td>radio waves</td> <td>microwaves</td> <td></td> <td>visible light</td> <td></td> <td>gamma photons</td> </tr> </table> | radio waves | microwaves | | visible light | | gamma photons | 1 | microwaves in more than one box equals 0 ignore completion of other boxes |
| radio waves | microwaves | | visible light | | gamma photons | | | | | | |
| | (c) | | <i>any three from:</i> water (in food); (1) (food/water) absorbs <u>microwaves</u> ; (1) transferring energy to heat; (1) microwaves reflect off (metal) walls (of oven); (1) microwaves can't escape; (1) people not harmed; (1) | 3 | accept <u>microwaves</u> go into food/water accept heating up food accept bounce off walls accept microwaves contained inside ignore other safety features | | | | | | |
| Total | | | | 5 | | | | | | | |

| Question | | Answer | Marks | Guidance | | | | | | | | |
|----------------------------------|-----|---|----------------------------------|---|-------------------------------|--|--------------------------------|--|------------------------------|---|---|--|
| 3 | (a) | modulates | 1 | more than one answer circled equals no marks | | | | | | | | |
| | (b) | <table border="1"> <tr> <td>Radio waves cannot be reflected.</td> <td></td> </tr> <tr> <td>Radio waves are absorbed</td> <td></td> </tr> <tr> <td>Radio waves travel slower</td> <td></td> </tr> <tr> <td>Radio waves pass through ...</td> <td>✓</td> </tr> </table> | Radio waves cannot be reflected. | | Radio waves are absorbed | | Radio waves travel slower | | Radio waves pass through ... | ✓ | 1 | if more than one box indicated, no marks |
| Radio waves cannot be reflected. | | | | | | | | | | | | |
| Radio waves are absorbed | | | | | | | | | | | | |
| Radio waves travel slower | | | | | | | | | | | | |
| Radio waves pass through ... | ✓ | | | | | | | | | | | |
| | (c) | <p><i>any three from:</i></p> <p>radio waves spread out (in all directions); (1)</p> <p>signal/wave gets weaker/has less amplitude/gets smaller; (1)</p> <p>receiver has to amplify it; (1)</p> <p>receiver also amplifies noise; (1)</p> <p>(noise is heard as) static/hiss/crackle/interference; (1)</p> <p>noise increases with increasing distance; (1)</p> <p>so message gets confused with noise; (1)</p> | 3 | <p>ignore radio waves further apart</p> <p>accept has to boost it</p> <p>accept static/hiss/crackle/interference for noise</p> <p>accept do not hear message so well/message disrupted</p> <p>ignore do not hear radio so well</p> | | | | | | | | |
| Total | | | 5 | | | | | | | | | |

| Question | | Answer | Marks | Guidance | | | | | | | | | | | | | | |
|-----------------|---------|---|---------------|---|--------|-------|--|------------------------|-----------------|---------------------------|-------------|--|--|---------------|--|--|---|--|
| 4 | (a) | stimulus simple most | 2 | 3 correct = 2 marks 2 correct = 1 mark | | | | | | | | | | | | | | |
| | (b) | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">part of Danny</th> <th style="width: 30%;"></th> <th style="width: 40%;">system</th> </tr> </thead> <tbody> <tr> <td>brain</td> <td rowspan="2" style="text-align: center; vertical-align: middle;"> </td> <td>central nervous system</td> </tr> <tr> <td>sensory neurons</td> <td>peripheral nervous system</td> </tr> <tr> <td>spinal cord</td> <td></td> <td></td> </tr> <tr> <td>motor neurons</td> <td></td> <td></td> </tr> </tbody> </table> | part of Danny | | system | brain | | central nervous system | sensory neurons | peripheral nervous system | spinal cord | | | motor neurons | | | 2 | 4 lines correct = 2 marks 2 or 3 lines correct = 1 mark |
| part of Danny | | system | | | | | | | | | | | | | | | | |
| brain | | central nervous system | | | | | | | | | | | | | | | | |
| sensory neurons | | peripheral nervous system | | | | | | | | | | | | | | | | |
| spinal cord | | | | | | | | | | | | | | | | | | |
| motor neurons | | | | | | | | | | | | | | | | | | |
| | (c) (i) | retrieval, storage | 2 | 1 mark for each correct response | | | | | | | | | | | | | | |
| | (ii) | long-term | 1 | if more than one box indicated, no marks | | | | | | | | | | | | | | |
| Total | | | 7 | | | | | | | | | | | | | | | |

| Question | | Answer | Marks | Guidance |
|--------------|--|---------------------------------|----------|----------|
| 5 | | billions; pathways; more; | 3 | |
| Total | | | 3 | |

| Question | | Answer | Marks | Guidance |
|--------------|-----|---|----------|---|
| 6 | (a) | <p><i>any three from:</i></p> <p>no conscious thought/no use of brain/without thinking/automatic response/involuntary response; (1)</p> <p>neurons carry (electrical) impulses; (1)</p> <p>impulses go from sensor/receptor to effector; (1)</p> <p>through relay neuron/link neuron; (1)</p> <p>(insulating) fatty sheath gives faster impulses; (1)</p> | 3 | <p>accept electrical signal as impulse</p> <p>accept sensory/receptor neuron and motor neuron as sensor or effector</p> <p>not brain accept interneuron</p> <p>ignore references to heat insulation/protection</p> |
| | (b) | <p>muscle cells <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>hormone secreting cells <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> | 1 | both needed for the mark |
| Total | | | 4 | |

| Question | | Answer | Marks | Guidance | | | | | | | | |
|-----------------------------|-----|---|-------------------|--|----------------------|--|------------------------|--|-----------------------------|--|---|--|
| 7 | (a) | first and fourth | 1 | both needed for the mark | | | | | | | | |
| | (b) | (i) carbon dioxide | 1 | more than one answer circled equals no marks | | | | | | | | |
| | | (ii) calcium chloride / CaCl ₂ | 1 | if both the name and formula are given, mark the name only (ignore formula) if only the formula is given, it must be correct | | | | | | | | |
| | (c) | <table border="1"> <tbody> <tr> <td>It stops fizzing.</td> <td>✓</td> </tr> <tr> <td>The acid goes green.</td> <td></td> </tr> <tr> <td>The liquid disappears.</td> <td></td> </tr> <tr> <td>The limescale catches fire.</td> <td></td> </tr> </tbody> </table> | It stops fizzing. | ✓ | The acid goes green. | | The liquid disappears. | | The limescale catches fire. | | 1 | if more than one box indicated, no marks |
| It stops fizzing. | ✓ | | | | | | | | | | | |
| The acid goes green. | | | | | | | | | | | | |
| The liquid disappears. | | | | | | | | | | | | |
| The limescale catches fire. | | | | | | | | | | | | |
| | (d) | H ⁺ / hydrogen (ion)/(positive) hydrogen (ion)/hydrogen ⁺ /proton | 1 | look for correct superscript eg: above the crossbar of H | | | | | | | | |
| Total | | | 5 | | | | | | | | | |

| Question | | Answer | Marks | Guidance | | | | | | | | |
|--|-----|--|--|--|--|--|--|---|--|--|---|--|
| 8 | (a) | <table border="1"> <tr> <td>$\text{Zn} + \text{H}_2\text{SO}_4 + \text{ZnSO}_4 \rightarrow \text{H}_2$</td> <td></td> </tr> <tr> <td>$\text{Zn} \rightarrow \text{H}_2\text{SO}_4 + \text{ZnSO}_4 + \text{H}_2$</td> <td></td> </tr> <tr> <td>$\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$</td> <td>✓</td> </tr> <tr> <td>$\text{Zn} \rightarrow \text{H}_2\text{SO}_4 + \text{ZnSO}_4 \rightarrow \text{H}_2$</td> <td></td> </tr> </table> | $\text{Zn} + \text{H}_2\text{SO}_4 + \text{ZnSO}_4 \rightarrow \text{H}_2$ | | $\text{Zn} \rightarrow \text{H}_2\text{SO}_4 + \text{ZnSO}_4 + \text{H}_2$ | | $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$ | ✓ | $\text{Zn} \rightarrow \text{H}_2\text{SO}_4 + \text{ZnSO}_4 \rightarrow \text{H}_2$ | | 1 | if more than one box indicated, no marks |
| $\text{Zn} + \text{H}_2\text{SO}_4 + \text{ZnSO}_4 \rightarrow \text{H}_2$ | | | | | | | | | | | | |
| $\text{Zn} \rightarrow \text{H}_2\text{SO}_4 + \text{ZnSO}_4 + \text{H}_2$ | | | | | | | | | | | | |
| $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$ | ✓ | | | | | | | | | | | |
| $\text{Zn} \rightarrow \text{H}_2\text{SO}_4 + \text{ZnSO}_4 \rightarrow \text{H}_2$ | | | | | | | | | | | | |
| | (b) | <p>volume of gas/mass of flask and contents; (implication) of time;</p> <p>(idea of time) intervals in seconds/minutes</p> | 3 | <p>eg: measure at the start and finish/how long it takes</p> <p>ignore slower/faster</p> <p>ignore at start only or at end only</p> <p>an answer such as measure every 5 minutes would score 2 marks</p> | | | | | | | | |
| | (c) | <p>line starting at the origin (by eye) and rising more steeply; reaching the same vertical level</p> | 2 | accept 2 straight lines | | | | | | | | |
| | (d) | <p>zinc evaporated half gone dry</p> | 3 | <p>all four correct = 3 marks</p> <p>three correct = 2 marks</p> <p>two correct = 1 mark</p> <p>one correct = 0 marks</p> | | | | | | | | |
| Total | | | 9 | | | | | | | | | |

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

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity

OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553

© OCR 2012

