

Science A

General Certificate of Secondary Education

Unit **A212/01**: Unit 2: Modules B2, C2, P2 (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.

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 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:
- Read through the whole answer from start to finish**
 - Decide the level that best fits** the answer – match the quality of the answer to the closest level descriptor
 - 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) | nylon | 1 | |
| | (b) | hydrocarbons; (1) refined; (1) polymers; (1) | 3 | |
| | (c) | 4 | 1 | more than one number circled = 0 marks |
| Total | | | 5 | |

| Question | | Answer | Marks | Guidance | | | | | | | | |
|--------------|-------|---|----------|--|---|--|---|--|--|---|---|---|
| 2 | (a) | <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>true</th> <th>false</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">✓</td> </tr> </tbody> </table> | true | false | ✓ | | ✓ | | | ✓ | 2 | all 3 lines correct = 2 marks 2 lines correct = 1 mark |
| true | false | | | | | | | | | | | |
| ✓ | | | | | | | | | | | | |
| ✓ | | | | | | | | | | | | |
| | ✓ | | | | | | | | | | | |
| | (b) | <p><i>any two from:</i></p> <p>saves on non renewable resources / (named) raw materials; (1) saves on energy in extracting raw materials; (1) saves on pollution caused by extracting raw materials; (1)</p> <p>uses less landfill space AW / landfills are an eyesore; (1) idea of non-biodegradable / will not rot; (1)</p> | 2 | <p>ignore ideas of damage to the environment</p> <p>ignore "might run out of plastic" ignore "can use again"</p> <p>ignore gases produced by decomposition</p> | | | | | | | | |
| Total | | | 4 | | | | | | | | | |

| Question | | | Answer | Marks | Guidance |
|--------------|-----|------|---|----------|--|
| 3 | (a) | (i) | 4 (mm) | 1 | |
| | | (ii) | 23.5 (mm) | 1 | allow 23 – 24 |
| | (b) | (i) | ring drawn around point at (400,12.5) | 1 | |
| | | (ii) | point does not fit pattern / does not fit into the graph or WTTE (1) repeat / discard / ignore (1) | 2 | accept idea of wrong measurement ignore vague comments e.g. human error |
| Total | | | | 5 | |

| Question | | | Answer | Marks | Guidance |
|--------------|-----|--|--|----------|---|
| 4 | (a) | | The user never goes near the microwave oven. | | |
| | | | The walls and door of the oven stop microwaves escaping. | ✓ | |
| | | | Microwaves are part of the electromagnetic spectrum. | | |
| | | | Microwave ovens heat food very quickly. | | |
| | (b) | | water (particles) absorb / are vibrated by microwaves (1); ovens are of high power / phones are of low power (1); | 2 | accept excited accept energy / frequency |
| Total | | | | 3 | |

| Question | | | Answer | Marks | Guidance |
|----------|--------------|--|-------------------------------|-------|----------|
| 5 | | | photons (1); absorbed (1); | 2 | |
| | Total | | | | 2 |

| Question | | Answer | Marks | Guidance | | | | | | | | | | |
|---|-------------------------------------|---|--------------------------------------|--|---|--------------------------|---------------------------------|-------------------------------------|--|--------------------------|---|-------------------------------------|---|--|
| 6 | (a) | <table border="1"> <tr> <td>Keeping cool by swimming in the sea.</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Putting sun-screen on burnt skin before going to bed.</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Staying indoors in the daytime.</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Sunbathing by the side of a swimming pool.</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Wearing cotton clothes that cover the body.</td> <td><input checked="" type="checkbox"/></td> </tr> </table> | Keeping cool by swimming in the sea. | <input type="checkbox"/> | Putting sun-screen on burnt skin before going to bed. | <input type="checkbox"/> | Staying indoors in the daytime. | <input checked="" type="checkbox"/> | Sunbathing by the side of a swimming pool. | <input type="checkbox"/> | Wearing cotton clothes that cover the body. | <input checked="" type="checkbox"/> | 2 | |
| Keeping cool by swimming in the sea. | <input type="checkbox"/> | | | | | | | | | | | | | |
| Putting sun-screen on burnt skin before going to bed. | <input type="checkbox"/> | | | | | | | | | | | | | |
| Staying indoors in the daytime. | <input checked="" type="checkbox"/> | | | | | | | | | | | | | |
| Sunbathing by the side of a swimming pool. | <input type="checkbox"/> | | | | | | | | | | | | | |
| Wearing cotton clothes that cover the body. | <input checked="" type="checkbox"/> | | | | | | | | | | | | | |
| | (b) | <p>must include 1 benefit, 1 risk and 1 assessment of risk 1 benefit; (1) 1 risk; (1)</p> <p>assessment of risk: benefit outweighs risk/risk (thought to be) small (1)</p> <p>OR</p> <p>increased risk due to increased height / sun reflecting off snow (1)</p> <p>OR</p> <p>idea of reduction of risk e.g. suncream, sunglasses, exposing less skin (1)</p> | 3 | <p>Benefits:</p> <ul style="list-style-type: none"> enhances appearance social acceptance of activity 'good for general health' i.e. produces vitamin D in skin outdoor activities are pleasant / fun <p>Risks</p> <ul style="list-style-type: none"> risk of (skin) cancer damage to cells/DNA / causes mutations sunburn cataracts <p>credit answer that understands perceived risk and actual risk being different ignore other risks associated with rock climbing / skiing like falling off</p> | | | | | | | | | | |
| Total | | | 5 | | | | | | | | | | | |

| Question | | | Answer | Marks | Guidance |
|--------------|-----|------|--|----------|--|
| 7 | (a) | (i) | 250 (J m ⁻² s ⁻¹) | 1 | |
| | | (ii) | 530 (J m ⁻² s ⁻¹) | 1 | |
| | (b) | (i) | B (70) and E (490) | 1 | both needed in any order accept energies instead of letters |
| | | (ii) | A (250) (1) | 1 | accept energy instead of letter |
| Total | | | | 4 | |

| Question | | | Answer | Marks | Guidance | | | | | | | | | | | | | | | | | | | | |
|---|-----------------------|----------------|--|--|------------------------------|---------------------------------------|---|---|--|-------------------------------------|----------------|---|--|---------|--|---|--|-----|-----|--|--|---|-----|---|--|
| 8 | (a) | | <table border="1"> <thead> <tr> <th>Volunteer</th> <th colspan="3">The antibiotic tested for...</th> <th></th> </tr> <tr> <td></td> <td>..effectiveness only.</td> <td>..safety only.</td> <td>..effectiveness and safety.</td> <td></td> </tr> </thead> <tbody> <tr> <td>healthy</td> <td></td> <td>✓</td> <td></td> <td>(1)</td> </tr> <tr> <td>ill</td> <td></td> <td></td> <td>✓</td> <td>(1)</td> </tr> </tbody> </table> | Volunteer | The antibiotic tested for... | | | | | ..effectiveness only. | ..safety only. | ..effectiveness and safety. | | healthy | | ✓ | | (1) | ill | | | ✓ | (1) | 2 | |
| | | Volunteer | The antibiotic tested for... | | | | | | | | | | | | | | | | | | | | | | |
| | ..effectiveness only. | ..safety only. | ..effectiveness and safety. | | | | | | | | | | | | | | | | | | | | | | |
| healthy | | ✓ | | (1) | | | | | | | | | | | | | | | | | | | | | |
| ill | | | ✓ | (1) | | | | | | | | | | | | | | | | | | | | | |
| | (b) | | <table border="1"> <tbody> <tr> <td>Always complete a course of treatment.</td> <td>✓</td> </tr> <tr> <td>Only take antibiotics when necessary.</td> <td>✓</td> </tr> <tr> <td>Stop taking antibiotics when you feel better.</td> <td></td> </tr> <tr> <td>Take antibiotics for all illnesses.</td> <td></td> </tr> <tr> <td>Test antibiotics on animals before giving them to humans.</td> <td></td> </tr> </tbody> </table> | Always complete a course of treatment. | ✓ | Only take antibiotics when necessary. | ✓ | Stop taking antibiotics when you feel better. | | Take antibiotics for all illnesses. | | Test antibiotics on animals before giving them to humans. | | 2 | | | | | | | | | | | |
| Always complete a course of treatment. | ✓ | | | | | | | | | | | | | | | | | | | | | | | | |
| Only take antibiotics when necessary. | ✓ | | | | | | | | | | | | | | | | | | | | | | | | |
| Stop taking antibiotics when you feel better. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Take antibiotics for all illnesses. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test antibiotics on animals before giving them to humans. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | | | | 4 | | | | | | | | | | | | | | | | | | | | | |

| Question | | Answer | Marks | Guidance |
|--------------|-----|---|----------|--|
| 9 | (a) | immune; | 1 | |
| | (b) | form of a (disease causing) organism / virus / bacterium / pathogen / antigen (1); that is safe / dead / modified / inactive (1) | 2 | ignore antibodies ignore "form of a disease" unless qualified with organism accept weakened / weaker ignore weak |
| | (c) | (i) | 2 | ignore "makes him immune" |
| | | (ii) | 1 | accept microorganisms changing/mutate/ different strain accept vaccination/immunity wears off ignore tetanus is a virus ignore any reference to injury |
| | (d) | <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">There are side effects that could be harmful for some people. <input type="checkbox"/></div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">It would prevent large numbers of people getting the disease. <input checked="" type="checkbox"/></div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Individuals may get the disease. <input type="checkbox"/></div> <div style="border: 1px solid black; padding: 2px;">Some children who are vaccinated will get a mild form of the disease. <input type="checkbox"/></div> | 1 | more than 1 tick = 0 marks |
| Total | | | 7 | |

| Question | | Answer | Marks | Guidance | | | | | | | | | | | | | | | | | | |
|------------------|----------------|---|------------------|---|----------------|---------|---|--|----------|--|---|---------------|---|--|---------|---|--|--------|---|--|---|------------------------|
| 10 | (a) | glucose/sugar/protein/amino acids/fat/fatty acids/glycerol/oxygen/O ₂ ; carbon dioxide/CO ₂ ; fat (deposits)/plaque/cholesterol | 2 | 3 correct =(2), 2 correct = (1) ignore food accept water ignore lactic acid ignore clot | | | | | | | | | | | | | | | | | | |
| | (b) | <table border="1"> <thead> <tr> <th>Lifestyle factor</th> <th>Increases risk</th> <th>Decreases risk</th> </tr> </thead> <tbody> <tr> <td>alcohol</td> <td>✓</td> <td></td> </tr> <tr> <td>exercise</td> <td></td> <td>✓</td> </tr> <tr> <td>saturated fat</td> <td>✓</td> <td></td> </tr> <tr> <td>smoking</td> <td>✓</td> <td></td> </tr> <tr> <td>stress</td> <td>✓</td> <td></td> </tr> </tbody> </table> | Lifestyle factor | Increases risk | Decreases risk | alcohol | ✓ | | exercise | | ✓ | saturated fat | ✓ | | smoking | ✓ | | stress | ✓ | | 1 | all correct for 1 mark |
| Lifestyle factor | Increases risk | Decreases risk | | | | | | | | | | | | | | | | | | | | |
| alcohol | ✓ | | | | | | | | | | | | | | | | | | | | | |
| exercise | | ✓ | | | | | | | | | | | | | | | | | | | | |
| saturated fat | ✓ | | | | | | | | | | | | | | | | | | | | | |
| smoking | ✓ | | | | | | | | | | | | | | | | | | | | | |
| stress | ✓ | | | | | | | | | | | | | | | | | | | | | |
| 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

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

