

GCSE

Biology A

Unit **A163/02**: Ideas in Context plus B7 (Higher Tier)

General Certificate of Secondary Education

Mark Scheme for June 2017

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.

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 2017




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 | alternative wording |
| ORA | or reverse argument |

Available in RM Assessor 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

If a candidate alters his/her response, examiners should accept the alteration.

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 boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

| |
|-------------------------------------|
| <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |

This would be worth 1 mark.

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.

Marking method for tick boxes:

Always check the additional guidance.

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. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses.

Credit should be given for each box correctly ticked. 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 a city in England, then in the boxes

| | |
|--------------------|--|
| 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 |

MARK SCHEME:

| Question | | | Answer | Marks | Guidance |
|----------|---|----|---|-------|---|
| 1 | a | i | muscle drawn to left of humerus and labelled; (1) | 1 | accept label as muscle/antagonistic muscle/triceps |
| | | ii | tendons labelled and clearly attached to scapula and ulna; (1) | 1 | accept correctly attached labelled tendon |
| | b | | <p>any two from:</p> <p>(muscles can only move joints) by contraction; (1)</p> <p>muscles work as an antagonistic pair; (1)</p> <p>idea that one muscle bends joint and second straightens joint; (1)</p> | 2 | <p>accept getting shorter/pull bone</p> <p>ignore muscle tenses</p> <p>one muscle contracts and the other muscle relaxes (2)</p> |
| | c | | | 3 | <p>one mark each for</p> <p>cartilage correct property and job (1);</p> <p>ligament correct property and job (1);</p> <p>tendon correct property and job (1);</p> |
| | | | Total | 7 | |

| Question | | Answer | Marks | Guidance |
|----------|---|--|----------|--|
| 2 | a | <p>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</p> <p>Level 3 (5–6 marks)</p> <p>Writes about most components of the blood and relates this to the molecules that they transport.</p> <p><i>Quality of written communication does not impede communication of the science at this level.</i></p> <p>Level 2 (3–4 marks)</p> <p>Writes about some components of the blood AND refers to some molecules transported by the blood.</p> <p><i>Quality of written communication partly impedes communication of the science at this level.</i></p> <p>Level 1 (1–2 marks)</p> <p>Writes about components of the blood OR molecules that are transported by the blood.</p> <p><i>Quality of written communication impedes communication of the science at this level.</i></p> <p>0 marks</p> <p>No response or no response worthy of credit.</p> | 6 | <p>This question is targeted at grades up to C</p> <p>Indicative scientific points may include</p> <p>Blood components Red blood cells White Blood Cells Platelets Plasma</p> <p>Molecules carried Oxygen/haemoglobin (by red blood cell) Carbon dioxide (by plasma/rbc) Glucose/amino acids (plasma) Hormones (plasma) urea (plasma) water (plasma) Antibodies (plasma)</p> <p>ignore mineral ions/salts</p> |
| | b | <p>A to the left of first red blood cell in line with capillary, B to the right of last red blood cell in line with capillary (1);</p> <p>tissue fluid between the bottom of the cells and the top capillary wall ; (1)</p> | 2 | <p>accept highest (blood pressure) for A and lowest (blood pressure) for B</p> <p>end of label line/arrow must be in the right area</p> |
| | | Total | 8 | |

| Question | | | Answer | Marks | Guidance | | | | | | | | | | | | | | | |
|----------------------------|------|----------|---|------------|---|----------|----------------------------|---|--|-------------------------|--|---|---------------------------|--|---|-------------------|--|---|---|---|
| 3 | a | i | 110 100 (1) | 1 | both required for 1 mark | | | | | | | | | | | | | | | |
| | | ii | 55% (1) | | | | | | | | | | | | | | | | | |
| | b | | <table border="1"> <thead> <tr> <th>conclusion</th> <th>fits</th> <th>Does not</th> </tr> </thead> <tbody> <tr> <td>There is a correlation....</td> <td>✓</td> <td></td> </tr> <tr> <td>For a given power</td> <td></td> <td>✓</td> </tr> <tr> <td>The greater the power ...</td> <td></td> <td>✓</td> </tr> <tr> <td>Heart rates</td> <td></td> <td>✓</td> </tr> </tbody> </table> | conclusion | fits | Does not | There is a correlation.... | ✓ | | For a given power | | ✓ | The greater the power ... | | ✓ | Heart rates | | ✓ | 3 | four correct = 3 marks three correct = 2 marks two correct = 1 mark |
| conclusion | fits | Does not | | | | | | | | | | | | | | | | | | |
| There is a correlation.... | ✓ | | | | | | | | | | | | | | | | | | | |
| For a given power | | ✓ | | | | | | | | | | | | | | | | | | |
| The greater the power ... | | ✓ | | | | | | | | | | | | | | | | | | |
| Heart rates | | ✓ | | | | | | | | | | | | | | | | | | |
| | c | | <p>any two from: Jon repeats investigation/test; (1)</p> <p>other people do the same test/investigation; (1)</p> <p>idea that Jon trains at more/ bigger range of altitudes; (1)</p> | 2 | <p>ignore just take more data/readings.</p> <p>ignore data/readings from other people.</p> | | | | | | | | | | | | | | | |
| | d | | <p>any two from: the blood vessels (supplying the skin) dilate/widen/vasodilation; (1)</p> <p>allowing more/increased blood flow to the skin surface/through the capillaries (1)</p> <p>ref to (increased) heat loss/radiation; (1)</p> | 2 | <p>reject capillaries/veins dilate ignore blood vessels expand/get bigger</p> <p>reject blood vessels move (closer) to the surface</p> <p>ignore cool down</p> | | | | | | | | | | | | | | | |
| Total | | | | 9 | | | | | | | | | | | | | | | | |

| Question | Answer | Marks | Guidance |
|----------|--|-------|---|
| 4 | <p><i>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</i></p> <p>Level 3 (5–6 marks) Explains why diabetics benefit from knowledge of GI AND correctly suggests low GI foods in all five types <i>Quality of written communication does not impede communication of the science at this level.</i></p> <p>Level 2 (3–4 marks) Explains why diabetics benefit from knowledge of GI AND correctly suggests low GI foods in some food types <i>Quality of written communication partly impedes communication of the science at this level.</i></p> <p>Level 1 (1–2 marks) Partial explanation of why diabetics benefit from knowledge of GI OR correctly suggests low GI foods in some food types <i>Quality of written communication impedes communication of the science at this level.</i></p> <p>0 marks No response or no response worthy of credit.</p> | | <p>This question is targeted at grades up to A*</p> <p>Relevant points about why diabetics benefit from knowledge</p> <p><i>General points about diabetes</i></p> <ul style="list-style-type: none"> • ref to <u>Type 1</u> and <u>Type 2</u> diabetes • (Type 1) not enough/lack of insulin • (Type 2) less sensitive to insulin • diabetics unable to control/regulate blood sugar/glucose levels • Diabetics need to avoid foods that will raise their blood glucose levels (quickly)/need foods that will help keep the blood glucose level stable • Type 2 diabetics control blood glucose levels with diet • Diabetics should have a diet complex/slow release carbohydrates/starch • Complex carbohydrates help maintain a constant blood sugar level • Diabetics should have a diet high in fibre (to allow for slower absorption) |

| Question | | | Answer | Marks | Guidance |
|--------------|--|--|--------|----------|--|
| | | | | | <p><i>GI points</i></p> <ul style="list-style-type: none"> • High(er) blood glucose/sugar levels from high GI foods ORA • High GI foods raise/drop blood glucose/sugar levels quickly/quicker (than low GI) ORA • Low GI foods maintain blood glucose levels for longer ORA • Diabetics should avoid high GI foods/ 70 and above/eat foods that are low GI/ 55 and below. <p>Suitable foods all low GI Snacks (chocolate bar, popcorn) Starchy (brown rice, spaghetti, white rice) Vegetable (broccoli, carrots, green peas) Fruits (apple, cherries) Dairy (custard, plain yogurt, soy milk, whole milk)</p> |
| Total | | | | 6 | |

| Glycaemic Index (GI) | | | | | | | | | |
|----------------------|----|----------------|----|------------|----|------------|-----|---------------|----|
| Snacks | GI | High in starch | GI | Vegetables | GI | Fruits | GI | Dairy | GI |
| milk chocolate | 49 | brown rice | 55 | broccoli | 10 | apple | 38 | custard | 43 |
| doughnut | 76 | pancakes | 67 | beetroot | 64 | bananas | 56 | ice cream | 60 |
| energy bar | 58 | baked potatoes | 85 | carrots | 49 | cherries | 22 | plain yoghurt | 14 |
| popcorn | 55 | spaghetti | 38 | green peas | 48 | dates | 103 | soy milk | 31 |
| pretzels | 83 | white rice | 38 | onions | 75 | watermelon | 72 | whole milk | 30 |

| Question | | Answer | Marks | Guidance |
|----------|---|---|-------|---|
| 5 | a | <p>any two from:</p> <p>rabbit/animal leaves/removed/migrates; (1)</p> <p>(nitrogen compounds/soil) may be washed away; (1)</p> <p>(crop) plants/timber may be harvested/taken away; (1)</p> | 2 | <p>accept herbivore</p> <p>accept soil removed/taken away</p> <p>accept deforestation</p> |
| | b | i | 2 | <p>accept any 2 correct answers for 1 mark each</p> <p>deduct one mark for each additional incorrect response</p> <p>accept all three correct answers (2 marks)</p> |
| | | ii | 3 | <p>UK adds 213.3 more (tonnes of fertiliser) than Spain ORA/ UK adds more (tonnes of fertiliser) than Spain-1038.3 ORA accept student is correct/Yes if supported by 213.3/1038.3</p> <p>1038.3/213.3</p> <p>2047.9 X 50.7 ÷ 100/ 2047.9 X 0.507</p> |
| | | | | <p>correct calculation of tonnes of fertiliser AND linked to correct conclusion (Spain uses less fertiliser/student is correct) = 3 marks</p> <p>correct calculation without a correct conclusion = 2 marks</p> <p>correct working but incorrect answer = 1 mark</p> |

| | | | | | | | | | | |
|---|---|-----|---|-----------|--|---|---|---|---|--|
| | | iii | <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="background-color: #cccccc;">D</td> <td>C</td> <td>A</td> <td>B</td> <td>E</td> </tr> </table> | D | C | A | B | E | 1 | |
| D | C | A | B | E | | | | | | |
| | | iv | <p>any two from:</p> <p>idea of increased (crop) yield/production; (1)</p> <p>(community gets)more/enough food; (1)</p> <p>cheaper food/idea of financial benefit; (1)</p> <p>no need for crop rotation; (1)</p> <p>idea that crops can be grown on infertile land (1)</p> | 2 | accept faster growth/make food more quickly | | | | | |
| | c | i | sun/sunlight/solar energy | 1 | do not accept: light | | | | | |
| | | ii | <p>any two from:</p> <p>crude oil takes millions of years to form (from dead organisms); (1)</p> <p>being used faster than it can be replaced/made; (1)</p> <p>energy released from fossil fuels/burning originated from the sun; (1)</p> <p>idea that energy in fossil fuels has been 'locked away'/fossil sunlight energy; (1)</p> | 2 | | | | | | |
| | | | Total | 13 | | | | | | |

| Question | Answer | Marks | Guidance | | | | | | | | | | | | | | | | | | | | |
|---------------------------|--|----------|--|------------------------------|---|---|---|---|--------------------|----|----------|----------|---|----------------|-----|-----|-----------------|----------|---------------------------|------------------|---------|--------------------|------------------------------|
| 6 | <p><i>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</i></p> <p>Level 3 (5–6 marks) Comments on level of sustainability for all harvesting methods AND lists some environmental impacts</p> <p><i>Quality of written communication does not impede communication of the science at this level.</i></p> <p>Level 2 (3–4 marks) Comments on level of sustainability of some harvesting methods OR lists several environmental impacts</p> <p><i>Quality of written communication partly impedes communication of the science at this level.</i></p> <p>Level 1 (1–2 marks) Correctly lists some environmental impacts <i>Quality of written communication impedes communication of the science at this level.</i></p> <p>0 marks No response or no response worthy of credit.</p> | | <p>This question is targeted at grades up to A*</p> <p>Comment on sustainability of harvesting methods for :</p> <table border="1" data-bbox="1326 405 2042 687"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td>Sustainable</td> <td>No</td> <td>No/Least</td> <td>Yes/Most</td> <td>*</td> </tr> <tr> <td>Harvest</td> <td>low</td> <td>Low</td> <td>High/increasing</td> <td>variable</td> </tr> <tr> <td>Trend/Future yield</td> <td>stable / falling</td> <td>Falling</td> <td>stable/ small fall</td> <td>increasing/ uncertain /level</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Direct ranking of two methods e.g A is more sustainable than B (order C,D,A,B) <p>*For D - sustainable/ unsustainable insufficient requires qualification from rows below</p> <p>Environmental impact soil erosion desertification damage to water supplies silting of rivers/increased turbidity loss of (bio)diversity/extinction change/loss of habitats/named habitat/deforestation effect on rainfall/water cycle effect on carbon cycle/increased carbon dioxide local climate effects/effects on temperature</p> | | A | B | C | D | Sustainable | No | No/Least | Yes/Most | * | Harvest | low | Low | High/increasing | variable | Trend/Future yield | stable / falling | Falling | stable/ small fall | increasing/ uncertain /level |
| | A | B | C | D | | | | | | | | | | | | | | | | | | | |
| Sustainable | No | No/Least | Yes/Most | * | | | | | | | | | | | | | | | | | | | |
| Harvest | low | Low | High/increasing | variable | | | | | | | | | | | | | | | | | | | |
| Trend/Future yield | stable / falling | Falling | stable/ small fall | increasing/ uncertain /level | | | | | | | | | | | | | | | | | | | |
| | Total | 6 | | | | | | | | | | | | | | | | | | | | | |

| Question | | Answer | Marks | Guidance | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|------------------------|---|--------------|--|----------------------------------|--------------|--|--|---|--|--|---|--|--|--|--|--|---|--|--|---|--|--|---|--|--|--|--|--|---|---|---|
| 7 | a | James | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | b | <table border="1"> <thead> <tr> <th>suggestion</th> <th>advantage .. farmer</th> <th>advantage .. seed producer</th> <th>disadvantage</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td></td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td></td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td></td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>✓</td> </tr> </tbody> </table> | suggestion | advantage .. farmer | advantage .. seed producer | disadvantage | | | ✓ | | | ✓ | | | | | | ✓ | | | ✓ | | | ✓ | | | | | | ✓ | 3 | <p>Six correct= 3 marks four or five correct = 2 marks three correct = 1 mark</p> <p>deduct a mark for each incorrect additional response</p> |
| suggestion | advantage .. farmer | advantage .. seed producer | disadvantage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | c | <p>any two from:</p> <p>less public opposition/concern in Americas/ (more) public opposition/concern in UK; (1)</p> <p>different levels of awareness of advantages/disadvantages; (1)</p> <p>greater need for increased yield/food (1)</p> <p>(different) legislation/laws/regulations (1)</p> | 2 | we/people assume is reference to UK unless otherwise indicated | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Total | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Question | | Answer | Marks | Guidance |
|----------|---|---|----------|--|
| 8 | a | <p>any two from:</p> <p>show plastic package has broken/not air tight; (1)</p> <p>oxygen will get in; (1)</p> <p>(which will allow the) growth/entry of bacteria/microorganisms; (1)</p> <p>idea that quality of the food decreases/food should not be eaten/unsafe; (1)</p> | 2 | <p>ignore ref to use by/best before/past the sell by date/not fresh</p> <p>ignore oxygen increases</p> <p>accept may cause food poisoning</p> <p>ignore can't eat the food</p> |
| | b | some molecules (1) | 1 | deduct a mark for each incorrect additional response |
| | c | <p>any two from:</p> <p>single-cell protein; (1)</p> <p>enzymes (used in food production) (1)</p> <p>alcoholic drinks/alcohol/ethanol (1)</p> <p>yoghurt (1)</p> | 2 | <p>do not accept biogas, biofuel, antibiotics, insulin</p> <p>accept mycoprotein, Quorn™</p> <p>accept examples of enzymes e.g. chymosin that are produced by fermentation for the food industry.</p> <p>accept vinegar, soy sauce</p> |
| | | Total | 5 | |

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 2017

