

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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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 | <input type="checkbox"/> |
| Manchester | <input type="checkbox"/> |
| Paris | <input type="checkbox"/> |
| Southampton | <input type="checkbox"/> |

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) | homeostasis / thermoregulation / temperature regulation / temperature control; | 1 | accept phonetic spellings |
| | | (ii) | (energy) loss is the same as / equals (energy) gain; | 1 | accept visa versa accept “they are balanced” / happen at the same rate / they even out OWTTE |
| | (b) | | use of receptors; in skin for external temperature; in brain/hypothalamus for blood temperature; | 3 | need to make correct link between the site and the temperature detected accept “heat” for “temperature” |
| Total | | | | 5 | |

| Question | | Answer | Marks | Guidance | | | | | | | | | | | | | | | | |
|--------------|-----------|--|----------------|--|-----------|----------------|----------|--|--|---|----------|---|--|--|---------|--|--|---|---|--|
| 2 | (a) | (in) food and respiration | 1 | accept "eat" for food accept "metabolic water" or metabolism for respiration reject excretion | | | | | | | | | | | | | | | | |
| | (b) | <table border="1"> <thead> <tr> <th>process</th> <th>decreases</th> <th>increases</th> <th>stays the same</th> </tr> </thead> <tbody> <tr> <td>...sugar</td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>...water</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>...urea</td> <td></td> <td></td> <td>✓</td> </tr> </tbody> </table> | process | decreases | increases | stays the same | ...sugar | | | ✓ | ...water | ✓ | | | ...urea | | | ✓ | 2 | 3 correct rows = 2 marks 2 correct rows = 1 mark 0 or 1 correct rows = 0 marks more than one tick in a row is incorrect |
| process | decreases | increases | stays the same | | | | | | | | | | | | | | | | | |
| ...sugar | | | ✓ | | | | | | | | | | | | | | | | | |
| ...water | ✓ | | | | | | | | | | | | | | | | | | | |
| ...urea | | | ✓ | | | | | | | | | | | | | | | | | |
| | (c) | pituitary gland; | 1 | | | | | | | | | | | | | | | | | |
| Total | | | 4 | | | | | | | | | | | | | | | | | |

| Question | | Answer | Marks | Guidance |
|--------------|-----|--|----------|----------------------------|
| 3 | (a) | <pre> graph TD A[detects any change in oxygen levels] --> B[the brain] B --> C[receptors] C --> D[processes information about oxygen levels] D --> E[adds more or less oxygen] E --> F[effectors] F --> C </pre> | 1 | all lines correct = 1 mark |
| | (b) | <p><i>any three from:</i> idea that a change (is detected); (1) change reversed; (1) to the norm/ set point; (1) named example eg. temperature control; (1)</p> | 3 | OWTTE |
| Total | | | 4 | |

| Question | | Answer | | | Marks | Guidance |
|----------|-----|---|-------------|--------------|----------|---|
| 4 | (a) | nucleus / chromosomes; cytoplasm / ribosomes / rough ER; | | | 1 | ignore "gene / genes" two correct responses = 1 mark accept phonetic spellings, correct abbreviations e.g. RER |
| | (b) | The DNA molecule... | true | false | 2 | 5 correct = 2 marks 4 correct = 1 mark 3 or less correct = 0 marks more than one tick in a row is incorrect |
| | | ... has a double helix shape. | ✓ | | | |
| | | ... is found in chromosomes. | ✓ | | | |
| | | is made from four strands. | | ✓ | | |
| | | ... contains five different types of bases. | | ✓ | | |
| | | ... has bases which always pair up in the same way. | ✓ | | | |
| | | | | Total | 3 | |

| Question | | Answer | Marks | Guidance |
|--------------|-----|---|----------|--|
| 5 | (a) | <i>any three from;</i> auxin in the <u>tip</u> of plant; (1) auxin diffuses away from the tip; (1) auxin moves away from bright light/collects on dark side of plant shoot; (1) auxin promotes increased growth on dark side; (1) | 3 | OWTTE accept elongation on the dark side |
| | (b) | meristem / cambium; | 1 | accept phonetic spellings |
| Total | | | 4 | |

| Question | | | Answer | Marks | Guidance | | | | | | | | |
|--------------|-------|------|---|----------|---|---|--|--|---|---|--|---|--|
| 6 | (a) | (i) | A increases / doubles / multiplies; B separate / move apart / unwind / unzip / split / replicate / copies /doubles; D separate / move apart / split / dividing; | 3 | reject "halving" for D | | | | | | | | |
| | | (ii) | D and E; | 1 | allow D only reject E only | | | | | | | | |
| | (b) | | <table border="1"> <thead> <tr> <th>true</th> <th>false</th> </tr> </thead> <tbody> <tr> <td>✓</td> <td></td> </tr> <tr> <td></td> <td>✓</td> </tr> <tr> <td>✓</td> <td></td> </tr> </tbody> </table> | true | false | ✓ | | | ✓ | ✓ | | 1 | 3 correct responses = 1 mark more than one tick in a row is incorrect |
| true | false | | | | | | | | | | | | |
| ✓ | | | | | | | | | | | | | |
| | ✓ | | | | | | | | | | | | |
| ✓ | | | | | | | | | | | | | |
| Total | | | | 5 | | | | | | | | | |

| Question | | Answer | Marks | Guidance | | | | |
|--------------|----------|---|----------|---|--------------|----------|---|--------------------------------|
| 7 | (a) | <table border="1"> <tr> <td>axon</td> <td>B</td> </tr> <tr> <td>fatty sheath</td> <td>C</td> </tr> </table> | axon | B | fatty sheath | C | 1 | two correct responses = 1 mark |
| axon | B | | | | | | | |
| fatty sheath | C | | | | | | | |
| | (b) | 80; | 1 | 1 mark for $(90 + 80 + 85 + 75 + 70) \div 5 = 80$ (m/s) | | | | |
| | (c) | <p>idea of less insulation (from nearby neurons);</p> <p>idea of decrease in speed of (nerve) impulse / transmission;</p> | 2 | <p>accept "impulses leak out"</p> <p>ignore idea of protection of the neuron</p> <p>ignore idea of leak of information</p> <p>accept signal / message / information</p> | | | | |
| | (d) | effector; | 1 | | | | | |
| Total | | | 5 | | | | | |

| Question | | Answer | Marks | Guidance | | | | | |
|--------------|-----|---|----------|------------------------------|---|---|---|---|--|
| 8 | (a) | <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>(B)</td> <td>A</td> <td>D</td> <td>C</td> <td>E</td> </tr> </table> | (B) | A | D | C | E | 2 | all four letters correct = 1 mark sequence correct = 1 mark |
| (B) | A | D | C | E | | | | | |
| | (b) | only the first neuron can release the synapse chemical; only the second neuron contains receptor molecules (to accept the synapse chemical); | 2 | OWTTE | | | | | |
| | (c) | removed and increases | 1 | 2 correct responses = 1 mark | | | | | |
| Total | | | 5 | | | | | | |

| Question | | | Answer | Marks | Guidance | | | | | | | | | | | | |
|---|-----|------|--|-----------|---|--|--|--|--|---|---|---|---|-------------------------|---|---|---|
| 9 | (a) | (i) | storage AND retrieval of information; | 1 | OWTTE | | | | | | | | | | | | |
| | | (ii) | cerebral cortex / cerebrum / cerebral hemispheres; | 1 | ignore frontal / prefrontal lobe reject cerebellum | | | | | | | | | | | | |
| | (b) | | <table border="1"> <tbody> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td>I look for patterns in what I am learning ...</td><td>✓</td></tr> <tr><td>I go over my school work time and time again.</td><td>✓</td></tr> <tr><td>I colour-code my notes.</td><td>✓</td></tr> </tbody> </table> | | | | | | | I look for patterns in what I am learning ... | ✓ | I go over my school work time and time again. | ✓ | I colour-code my notes. | ✓ | 2 | 3 correct = 2 marks 2 correct = 1 mark see note 12 if more than 3 ticks |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| I look for patterns in what I am learning ... | ✓ | | | | | | | | | | | | | | | | |
| I go over my school work time and time again. | ✓ | | | | | | | | | | | | | | | | |
| I colour-code my notes. | ✓ | | | | | | | | | | | | | | | | |
| | (c) | | Daniel and Emma; | 1 | both correct responses (either order) = 1 mark | | | | | | | | | | | | |
| | (d) | | D (1); G (1); | 2 | accept in either order | | | | | | | | | | | | |
| | | | Total | 7 | | | | | | | | | | | | | |
| | | | Overall total | 42 | | | | | | | | | | | | | |

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