

Mark Scheme for January 2011

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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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Additional Guidance within any mark scheme takes precedence over the following guidance.

1. Mark strictly to the mark scheme.
2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.
3. Accept any clear, unambiguous response which is correct, eg mis-spellings if phonetically correct (but check additional guidance).
4. Abbreviations, annotations and conventions used in the detailed mark scheme:

| | |
|---------------------|---|
| / | = 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 | = alternative wording |
| ORA | = or reverse argument |

eg mark scheme shows 'work done in lifting/(change in) gravitational potential energy' (1)

"work done" = 0 marks

"work done lifting" = 1 mark

"change in potential energy" = 0 marks

"gravitational potential energy" = 1 mark

5. If a candidate alters his/her response, examiners should accept the alteration.
6. 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.

The example below illustrates how to apply this principle to an objective question.

eg for a one mark question, where ticks in boxes 3 and 4 are required for the mark

Put ticks (✓) in
the two correct
boxes.

| |
|---|
| |
| |
| ✓ |
| ✗ |
| |

*This would be
worth zero marks.*

Put ticks (✓) in
the two correct
boxes.

| |
|---|
| |
| |
| ✗ |
| ✗ |
| |

*This would be
worth one mark.*

Put ticks (✓) in
the two correct
boxes.

| |
|---|
| ✗ |
| ✗ |
| ✓ |
| ✓ |
| |

*This would be
worth one mark.*

7. 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.

8. 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, eg 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.

eg 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 |

| Question | | Expected Answers | Marks | Additional Guidance | | | | | | | | | | | | | | | |
|------------------------------|--------------------------|--|-------|--|-------|---------------------|--------------------------|--|------------------------------|---|-----|------------------------------|--------------------------|--|-------------------------|---------------------------------|---|-----|--|
| 1 | (a) | <table border="1"> <thead> <tr> <th></th> <th>true</th> <th>false</th> </tr> </thead> <tbody> <tr> <td>Nuclear weapons ...</td> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td>The dose from rocks and ...</td> <td></td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Radon gas is the largest ...</td> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td>The dose from space ...</td> <td></td> <td style="text-align: center;">✓</td> </tr> </tbody> </table> | | true | false | Nuclear weapons ... | ✓ | | The dose from rocks and ... | | ✓ | Radon gas is the largest ... | ✓ | | The dose from space ... | | ✓ | [2] | All rows correct = 2 marks Two or three rows correct = 1 mark |
| | true | false | | | | | | | | | | | | | | | | | |
| Nuclear weapons ... | ✓ | | | | | | | | | | | | | | | | | | |
| The dose from rocks and ... | | ✓ | | | | | | | | | | | | | | | | | |
| Radon gas is the largest ... | ✓ | | | | | | | | | | | | | | | | | | |
| The dose from space ... | | ✓ | | | | | | | | | | | | | | | | | |
| | (b) | <table border="1"> <tbody> <tr> <td></td> <td style="text-align: center;"><input type="checkbox"/></td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;"><input type="checkbox"/></td> <td></td> </tr> <tr> <td>radiotherapy to treat cancer</td> <td style="text-align: center;">✓</td> <td>(1)</td> </tr> <tr> <td></td> <td style="text-align: center;"><input type="checkbox"/></td> <td></td> </tr> </tbody> </table> | | <input type="checkbox"/> | | | <input type="checkbox"/> | | radiotherapy to treat cancer | ✓ | (1) | | <input type="checkbox"/> | | [1] | Tick in any other box = 0 marks | | | |
| | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| radiotherapy to treat cancer | ✓ | (1) | | | | | | | | | | | | | | | | | |
| | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| | (c) | <p>Any 3 from:</p> <ul style="list-style-type: none"> any clear reference to data or bar size in graph; dose from nuclear power very small/the least/lowest; other bigger sources of dose; risk/chance of getting cancer is low/unlikely to get cancer | [3] | One mark for each point. Allow reference to 8 bars. Allow reference to microsieverts. Allow also any discussion of the effect of distance. | | | | | | | | | | | | | | | |
| Total | | | [6] | | | | | | | | | | | | | | | | |

| Question | | Expected Answers | Marks | Additional Guidance |
|--------------|-----|---|-------|---------------------------------|
| 2 | (a) | <p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... is more penetrating ... <input checked="" type="checkbox"/> (1) </p> | [1] | Tick in any other box = 0 marks |
| | (b) | <p>A pipe in the desert. <input checked="" type="checkbox"/> (1)</p> <p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </p> | [1] | Tick in any other box = 0 marks |
| | (c) | <p>Any two from:</p> <ul style="list-style-type: none"> • protective clothing qualified by reference to <u>lead</u>; • shielded (by cabin/screen); • reference to distance from source; • tongs or other handling tools; • thick (lead) case to hold sources in transport; • regular checks for dose/wearing dosimeter badges ; • regular health and safety checks; • regular task changes/rota; • limit time of exposure; • training in the above | [2] | Allow other room. |
| Total | | | [4] | |

| Question | | Expected Answers | Marks | Additional Guidance |
|--------------|-----|---|-------|---|
| 3 | (a) | | [2] | D not used. Give mark as long as at least 3 boxes have been completed (1). A immediately before C (1). Allow marks for correct answers if words from sentences used rather than letters. eg 'turns turbine' = A |
| | (b) | <p>All the carbon in plants... <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p>All the carbon dioxide given off... <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> | [2] | One mark for each correct answer. If 3 ticks given, deduct 1 mark 4 or 5 ticks = 0 marks |
| Total | | | [4] | |

| Question | | Expected Answers | Marks | Additional Guidance | |
|--------------|-----|---|---|--|--|
| 4 | (a) | <p>Any two from:</p> <ul style="list-style-type: none"> falls (from 1963 to 2001)/overall downward trend/ rises until 1970/275000 tonnes fish/rises then falls; falls from 1971 (to 2001); small rise around 1981/ small rise around 1974/ small rise around 1997/ fluctuates/goes up and down; falls below the minimum population advised by scientists; | [2] | <p>Allow + or – 1 year/+ or – 10000 tonnes Ignore ref to other years.</p> | |
| | (b) | (i) | dodo, quagga or any suitable example (1) | [1] | <p>Allow mammoth. Allow hominids other than Homo sapiens.</p> |
| | | (ii) | <p><u>biodiversity</u> (1): prevent extinction/prevent dying out/reduction in numbers of species</p> <p><u>food webs</u> (1): effect on other species</p> <p><u>resources</u> (1): idea of maintaining such things as food, medicines, fibres, energy sources, ores, supply of materials</p> | [3] | <p>Ignore 'damage to food chain/web'.</p> <p>Allow recycling to preserve resources. Ignore maintaining resources/resources will run out.</p> |
| Total | | | [6] | | |

| Question | | Expected Answers | Marks | Additional Guidance |
|----------|---------|--|-------|---------------------------------|
| 5 | (a) | <p style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </p> <p>H. <i>habilis</i> lived longest ago...</p> | [1] | Tick in any other box = 0 marks |
| | (b) (i) | <p style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) </p> <p>H. <i>floresiensis</i></p> | [1] | Tick in any other box = 0 marks |
| | (c) | <p>common ancestor (1) extinct (1)</p> | [2] | 1 mark for each correct word. |
| | (d) (i) | <p style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> </p> <p>3 500 million years ago</p> | [1] | Tick in any other box = 0 marks |

| Question | | | Expected Answers | Marks | Additional Guidance |
|--------------|-----|------|---|------------|-------------------------------|
| 5 | (d) | (ii) | natural selection (1) variation (1) genes (1) | [3] | 1 mark for each correct word. |
| Total | | | | [8] | |

| Question | | | Expected Answers | Marks | Additional Guidance | | | | | | | | |
|-------------------------------|------------------------------|--|--|------------|--|--------|--------|-----------------------------|------------------------------|-------------------------|----------------------------|-------------------------------|------------------------------|
| 6 | (a) | | <p style="text-align: right;"><input type="checkbox"/></p> <p>Doctors have better methods ... <input checked="" type="checkbox"/> (1)</p> <p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p> <p>More people are obese ... <input checked="" type="checkbox"/> (1)</p> | [2] | If three ticks given, deduct 1 mark. Four or five ticks = 0 marks | | | | | | | | |
| | (b) | | don't know/understand about risk of diabetes (1) enjoy eating/not exercising/don't like healthy foods (1) | [2] | Ignore answers relating to the benefits of healthy eating. | | | | | | | | |
| | (c) | | different because of age of onset/treatment/reason (1) explanation for the difference (1) | [2] | <p>One mark for one way in which the two types of diabetes are different. One mark for explanation giving information from table below.</p> <p>Allow one mark for detail of type 1 diabetes and 1 mark for complementary detail of type 2 diabetes, as per the table (ie do not mix and match)</p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Type 1</th> <th>Type 2</th> </tr> </thead> <tbody> <tr> <td>pancreas not making insulin</td> <td>body/cells not using insulin</td> </tr> <tr> <td>usually in young people</td> <td>usually develops in adults</td> </tr> <tr> <td>treated by insulin injections</td> <td>treated by diet and exercise</td> </tr> </tbody> </table> <p>Ignore references to genetics.</p> | Type 1 | Type 2 | pancreas not making insulin | body/cells not using insulin | usually in young people | usually develops in adults | treated by insulin injections | treated by diet and exercise |
| Type 1 | Type 2 | | | | | | | | | | | | |
| pancreas not making insulin | body/cells not using insulin | | | | | | | | | | | | |
| usually in young people | usually develops in adults | | | | | | | | | | | | |
| treated by insulin injections | treated by diet and exercise | | | | | | | | | | | | |
| Total | | | | [6] | | | | | | | | | |

| Question | | Expected Answers | Marks | Additional Guidance |
|--------------|-----|------------------|------------|--|
| 7 | (a) | D (1) | [1] | |
| | (b) | A and C (1) | [1] | Both answers in either order for one mark. |
| Total | | | [2] | |

| Question | | Expected Answers | Marks | Additional Guidance |
|--------------|-----|---|------------|---|
| 8 | (a) | (i) Barry and Anwar (2) | [2] | One mark for each name in either order. |
| | | (ii) Barry (1) | [1] | |
| | | (iii) Donna (1) | [1] | |
| | (b) | <div style="display: flex; flex-direction: column; align-items: center;"> <div style="border: 1px solid black; width: 150px; height: 20px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Fields are smaller</div> <div style="border: 1px solid black; width: 150px; height: 20px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Pests that eat one crop may not eat a different one.</div> <div style="border: 1px solid black; width: 150px; height: 20px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Crops are rotated</div> <div style="border: 1px solid black; width: 150px; height: 20px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Walls and hedges are habitats for natural predators.</div> </div> | [2] | One mark for each correct line. If more than one line is drawn from either or both left hand boxes, ignore that box. |
| Total | | | [6] | |

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