

# Mark Scheme (Results)

January 2014

International GCSE Human Biology  
(4HB0) Paper 02

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## General Marking Guidance

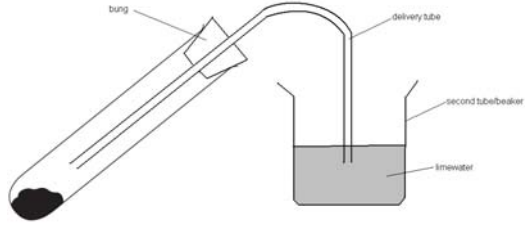
- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

| <b>Question number</b> | <b>Answer</b>                                     | <b>Notes</b> | <b>Marks</b> |
|------------------------|---|--------------|--------------|
| 1 (a)                  | sludge digester;<br>filter bed;<br>aeration tank; | In any order | 3            |
| (b)                    | methane;  |              | 1            |
| (c)                    | fertiliser/OWTTE;                                 |              | 1            |
| (d)                    | sludge digester;                                  |              | 1            |
|                        |   |              | Total 6      |

| Question number | Answer   | Notes  | Marks |
|-----------------|--|--|-------|
| 2 (a)           | chromosomes;   |  | 1     |
| (b)             | <p><i>mitosis</i> two chromosomes of each shape;<br/> <i>meiosis</i> one chromosome of each shape;</p> <p>i.e.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>mitosis</p> </div> <div style="text-align: center;">  <p>meiosis</p> </div> </div> |  | 2     |
| 2 (c) (i)       | adenine;<br>thymine;<br>cytosine;  | Accept phonetic spellings<br>Reject thiamine | 3     |
| (ii)            | cytosine;  | Accept phonetic spelling                     | 1     |

| Question number | Answer  | Notes | Marks    |
|-----------------|---|-------|----------|
| (d) (i)         | carried on the X/Y/sex chromosome;  |       | 1        |
| (ii)            | <p>parents <math>X^H Y</math> x <math>X^H X^h</math>;</p> <p>gametes <math>X^H</math> Y <math>X^H</math> <math>X^h</math>;</p> <p>offspring <math>X^H X^H</math> <math>X^H X^h</math> <math>X^H Y</math> <math>X^h Y</math>;</p> <p>phenotypes female fem carrier male male</p> <p>haemophiliac;</p> <p>1 in 4/25%/1/4/1:3;</p> |       | 5        |
|                 |   |       | Total 13 |

| Question number | Answer   | Notes | Marks   |
|-----------------|--|-------|---------|
| 3               | wash hands after using toilet/before handling food;<br>prevent transfer of organisms from faeces/prevent cross-contamination;<br>keep food covered;<br>to stop flies transferring bacteria;<br>cook food thoroughly;<br>kills bacteria;<br>keep uncooked food from cooked/use separate chopping boards for meat;<br>prevents transfer of bacteria from uncooked food/meat;<br>store food in fridge/freezer;<br>slows bacterial growth/reproduction;<br>wash food/ working surfaces/utensils before use;<br>removes/kills pathogens/bacteria;<br>do not refreeze food;<br>bacteria multiply/grow when thawed; |       | 8       |
|                 |  |       | Total 8 |

| Question number | Answer   | Notes | Marks          |
|-----------------|--|-------|----------------|
| 4 (a)           | carbon;  |       | 1              |
| (b)             | anhydrous cobalt chloride;<br>blue to pink;<br>anhydrous copper sulphate;<br>white to blue;<br>heat liquid;<br>boils at 100°C;   |       | 2              |
| (c)             | goggles;<br>point tube away from body;<br>use test tube holder/tongs;  |       | 2 max          |
| (d) (i)         | suitable set up of apparatus;<br><br>bung/stopper;<br>delivery tube/tubing;<br>second tube/beaker;<br>limewater/hydrogencarbonate solution present;<br><br>i.e.<br><br> |       | 1<br><br>3 max |
| (ii)            | limewater goes cloudy;   |       | 1              |
| (e)             | add water to tube;<br>to dissolve glucose/residue;<br>add Benedict's solution;<br>heat;<br>colour change (from blue) to brick red;   |       | 3 max          |
|                 |  |       | Total 13       |



| Question number | Answer  | Notes                        | Marks    |
|-----------------|---|------------------------------|----------|
| 5 (a)           | A = ulna;<br>B = radius;<br>C = scapula;<br>D = humerus;  |                              | 4        |
| (b)             | antagonistic pair;<br>X/biceps contracts;<br>stretches Y/triceps/Y/triceps relax;<br><u>pulls</u> forearm upwards;<br>Y/triceps contracts;<br>stretches X/biceps/X/biceps relax;<br><u>pulls</u> forearm downwards; |                              | 4 max    |
| (c)             | (M) one plane/180 <sup>0</sup> movement;<br><br>(N) 3 plane/360 <sup>0</sup> movement;  | Accept up <u>and</u><br>down | 2        |
|                 |   |                              | Total 10 |

| Question number | Answer   | Notes | Marks    |
|-----------------|--|-------|----------|
| 6 (a)           | mosquito bites infected person;<br>sucks up blood;<br>then bites non-infected person;<br>transfers organism in saliva/into<br>bloodstream; |       | 3 max    |
| (b)             | wet <u>and</u> warm;<br>mosquito requires these conditions for<br>laying<br>eggs/to breed;   |       | 2        |
| (c)             | confers resistance to malaria;<br>people with condition live to breeding<br>age;<br>pass on to offspring;                                  |       | 2 max    |
| (d)             | antibodies/memory cells produced;<br>remain in blood;<br>more rapid response (to severe<br>forms)/prevents<br>severe forms developing;     |       | 2        |
| (e)             | organism is always changing/mutating /<br>many<br>different strains/kinds/types;   |       | 1        |
|                 |  |       | Total 10 |



