

# Mark Scheme (Results)

March 2013

GCSE Biology  
5BI2F/01

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| Question Number | Answer                                                                                                                                                             | Acceptable answers | Mark       |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------|
| <b>1(a)</b>     | <p><b>enzyme</b></p> <p><b>molecule that the enzyme digests</b></p> <p>amylase</p> <p>lipase</p> <p>DNA</p> <p>fat (1)</p> <p>protein</p> <p>starch</p> <p>(1)</p> |                    | <b>(2)</b> |

| Question Number | Answer               | Acceptable answers | Mark       |
|-----------------|----------------------|--------------------|------------|
| <b>1(b)(i)</b>  | <b>A</b> amino acids |                    | <b>(1)</b> |

| Question Number | Answer                                 | Acceptable answers | Mark       |
|-----------------|----------------------------------------|--------------------|------------|
| <b>1(b)(ii)</b> | <b>B</b> pepsin has an optimum pH of 3 |                    | <b>(1)</b> |

| Question Number   | Answer                                                                                                                                                                                                                                                                     | Acceptable answers                                          | Mark       |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|------------|
| <b>1 (b)(iii)</b> | <p>A description including two from the following points</p> <ul style="list-style-type: none"> <li>pepsin has a lower activity</li> <li>pepsin works at a lower pH</li> <li>pepsin works within a narrower pH range</li> <li>the optimum pH of pepsin is lower</li> </ul> | <p>ORA</p> <p>Accept: pepsin works in acidic conditions</p> | <b>(2)</b> |

| Question Number | Answer                                                                                                                                                                                                                                                                                                        | Acceptable answers                                                        | Mark       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------|
| <b>1(b)(iv)</b> | <p>A explanation linking the following points</p> <ul style="list-style-type: none"> <li>• it is less active/activity only 6 arbitrary units (1)</li> <li>• (starting to) denature (1)</li> <li>• active site is changing shape (1)</li> <li>• cannot bind to its substrate as well at this pH (1)</li> </ul> | <p>Accept: reference to pH9 being the optimum/pH11 is not the optimum</p> | <b>(2)</b> |

| Question Number | Answer                      | Acceptable answers | Mark       |
|-----------------|-----------------------------|--------------------|------------|
| <b>2(a)(i)</b>  | <b>B</b> - oligosaccharides |                    | <b>(1)</b> |

| Question Number | Answer                                                                               | Acceptable answers                                                                                                                                                                                    | Mark       |
|-----------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>2(b)(i)</b>  | <ul style="list-style-type: none"> <li>15000 - 8000 (1)</li> <li>7000 (1)</li> </ul> | Accept: ecf - a sum that includes any value from 14200 to 15000 as alternative to 15000 minus 8000 and its correct answer e.g. 14200 - 8000 = 6200 (1 maximum)<br><br>2 marks for correct bald answer | <b>(2)</b> |

| Question Number | Answer                                                                  | Acceptable answers | Mark       |
|-----------------|-------------------------------------------------------------------------|--------------------|------------|
| <b>2(b)(ii)</b> | A description that includes:<br><br>increases number of useful bacteria | Ignore numbers     | <b>(1)</b> |

| Question Number | Answer                          | Acceptable answers | Mark       |
|-----------------|---------------------------------|--------------------|------------|
| <b>2(c)(i)</b>  | objective lens / eye piece lens | lens               | <b>(1)</b> |

| Question Number | Answer                                                                                                                                                                                                                        | Acceptable answers                                                                                                       | Mark       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------|
| <b>2(c)(ii)</b> | <p>A description including two of the following:</p> <ul style="list-style-type: none"> <li>• Image has more clarity/is more clear(1)</li> <li>• More detail can be seen(1)</li> <li>• Larger image can be seen(1)</li> </ul> | <p>Accept: more focussed</p> <p>Accept: named bacterial cell components</p> <p>Accept: idea of greater magnification</p> | <b>(2)</b> |

| Question Number  | Answer                                                                                                              | Acceptable answers                               | Mark       |
|------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------|
| <b>2(c)(iii)</b> | <p>Any one of the following:</p> <ul style="list-style-type: none"> <li>• cell wall</li> <li>• flagellum</li> </ul> | <p>Accept: cell membrane</p> <p>Ignore: tail</p> | <b>(1)</b> |

| Question Number | Answer      | Acceptable answers                                    | Mark       |
|-----------------|-------------|-------------------------------------------------------|------------|
| <b>3(a)(i)</b>  | mitosis (1) | Do not accept meiosis or any word that sounds similar | <b>(1)</b> |

| Question Number | Answer                    | Acceptable answers | Mark       |
|-----------------|---------------------------|--------------------|------------|
| <b>3(a)(ii)</b> | <b>B</b> - getting longer |                    | <b>(1)</b> |

| Question Number  | Answer                                                                                                                                                                                                                                          | Acceptable answers | Mark       |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------|
| <b>3(a)(iii)</b> | An description linking the following points <ul style="list-style-type: none"> <li>• idea that cells are becoming specialised (1)</li> <li>• to perform a specific function / eq (1)</li> <li>• eg phloem, xylem, root hair cell (1)</li> </ul> |                    | <b>(2)</b> |

| Question Number | Answer                                                                                          | Acceptable answers                                                                                                                                      | Mark       |
|-----------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>3(b)(i)</b>  | <ul style="list-style-type: none"> <li>• total = 30.3 (1)</li> <li>• mean = 10.1 (1)</li> </ul> | 2 marks for correct bald answer<br><br>Accept: incorrect values in sum $\div 3$ = correct answer e.g. $(20.4 + 14.6 + 10.6) \div 3 = 15.2$ (1 mark max) | <b>(2)</b> |

| Question Number | Answer                                                                                                                                                                                                                                                                                                                           | Acceptable answers                                                                                                                           | Mark       |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>3(b)(ii)</b> | A suggestion including two from the following points <ul style="list-style-type: none"> <li>• fertilisers increase plant height/growth (1)</li> <li>• A has a greater effect than B/ A has a greater effect than C/ B has a greater effect than C (1)</li> <li>• A has the greatest effect/C has the least effect (1)</li> </ul> | Accept: Fertiliser A/B/C increases height/growth (1)<br><br>ORA<br>Accept: reference to compared figures/correct manipulation of figures (1) | <b>(2)</b> |

| Question Number  | Answer                                                                                                                                                                                                                                                                                                                                       | Acceptable answers                                                                   | Mark       |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------|
| <b>3(b)(iii)</b> | <p>Any two from the following points</p> <ul style="list-style-type: none"> <li>• shoot/stem diameter (1)</li> <li>• number of branches (1)</li> <li>• number of leaves/flowers (1)</li> <li>• length/surface area of leaves (1)</li> <li>• length of roots (1)</li> <li>• size of fruit (1)</li> <li>• number/yield of fruit (1)</li> </ul> | <p>Accept: size of leaves</p> <p>Accept: mass/dry mass/weight of plant/fruit (1)</p> | <b>(2)</b> |

| Question Number | Answer                                                                                                                                                                                                                                     | Acceptable answers                                                  | Mark       |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|------------|
| <b>4(a)(i)</b>  | <p>A description that includes two of the following points</p> <ul style="list-style-type: none"> <li>• gametes produced (1)</li> <li>• haploid cells / half the number of chromosomes (1)</li> <li>• genetically different (1)</li> </ul> | <p>Accept: sex cells are produced</p> <p>Accept: 23 chromosomes</p> | <b>(2)</b> |

| Question Number | Answer                                                                                                                                                                                                                                      | Acceptable answers                                                                               | Mark       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------|
| <b>4(a)(ii)</b> | <p>A description that includes two of the following points</p> <ul style="list-style-type: none"> <li>• idea that sperm and egg cell/gametes join (1)</li> <li>• genetic information combines (1)</li> <li>• zygote produced (1)</li> </ul> | <p>Accept sex cells join</p> <p>Accept: chromosomes/DNA combines</p> <p>Accept: diploid cell</p> | <b>(2)</b> |

| Question Number | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Acceptable answers                                                                                    | Mark       |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------|
| <b>4(b)</b>     | <p>Suggestions that include <b>one</b> advantage from</p> <ul style="list-style-type: none"> <li>• differentiate into any (body) cell</li> <li>• grow/repair tissues/ body organ / limb</li> <li>• for transplants</li> </ul> <p>and one disadvantage from</p> <ul style="list-style-type: none"> <li>• embryos are destroyed</li> <li>• can become cancerous</li> <li>• justified ethical issue e.g some people feel that embryo has a right to life</li> </ul> | <p>Accept: research cures/treatments for disease/named genetic disease/Parkinsons/cancer/diabetes</p> | <b>(2)</b> |

| Question Number | Answer                                                                                                                                                                                                                                                              | Acceptable answers                                                               | Mark       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------|
| <b>4(c)(i)</b>  | <p>A description that includes three of the following points</p> <ul style="list-style-type: none"> <li>• two strands (1)</li> <li>• double helix (1)</li> <li>• reference to bases (1)</li> <li>• A with T / G with C (1)</li> <li>• hydrogen bonds (1)</li> </ul> | <p>Accept: description e.g twisted ladder</p> <p>Accept: complimentary pairs</p> | <b>(3)</b> |

| Question Number    | Answer           | Acceptable answers | Mark       |
|--------------------|------------------|--------------------|------------|
| <b>(4 )(c)(ii)</b> | <b>C</b> protein |                    | <b>(1)</b> |

| Question Number | Answer                      | Acceptable answers | Mark       |
|-----------------|-----------------------------|--------------------|------------|
| <b>5(a)(i)</b>  | <b>B</b> 80 cm <sup>3</sup> |                    | <b>(1)</b> |

| Question Number | Answer                                                                                                                                                                                                                                                                                                                                      | Acceptable answers                                           | Mark       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|------------|
| <b>5(a)(ii)</b> | <p>A description that includes <b>two</b> of the following:</p> <ul style="list-style-type: none"> <li>• it increases from rest to low intensity (1)</li> <li>• low to moderate intensity stays the same (1)</li> <li>• increases from moderate (1)</li> <li>• reference to compared figures/correct manipulation of figures (1)</li> </ul> | <p>Accept: increases as exercise intensity increases (1)</p> | <b>(2)</b> |

| Question Number  | Answer                                                                                                                                                                                                                                                                                                                            | Acceptable answers                                                                                                                                                               | Mark       |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>5(a)(iii)</b> | <p>A explanation that includes <b>three</b> of the following</p> <ul style="list-style-type: none"> <li>• (more) oxygen needed (1)</li> <li>• (more) glucose needed (1)</li> <li>• for (aerobic) respiration (1)</li> <li>• which releases (more) energy (1)</li> <li>• so that muscles can work for longer/harder (1)</li> </ul> | <p>Accept: reduce muscle fatigue/cramp</p> <p>Accept: to reduce build up of lactic acid (1)<br/>remove carbon dioxide/waste from cells (1)<br/>maintain body temperature (1)</p> | <b>(3)</b> |

| Question Number |              | Indicative Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Mark           |
|-----------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>QWC</b>      | <b>*5(b)</b> | <p>An explanation including some of the following points in a logical sequence</p> <ul style="list-style-type: none"> <li>• two sides to prevent mixing of blood</li> <li>• left side deals with oxygenated blood</li> <li>• thicker wall of left ventricles</li> <li>• pump blood to body</li> <li>• right side deals with deoxygenated blood</li> <li>• pumps blood to lungs</li> <li>• muscular wall of ventricles which contract</li> <li>• atria receive blood</li> <li>• valves to prevent backflow</li> <li>• correct reference to (named) arteries/veins</li> </ul> | <b>(6) exp</b> |
| <b>Level</b>    | <b>0</b>     | No rewardable content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                |
| <b>1</b>        | <b>1 - 2</b> | <ul style="list-style-type: none"> <li>• a limited explanation that links one structure to its function e.g. the right side pumps blood (to the lungs) OR the pulmonary vein takes blood into the heart.</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>                                                                                                                                                                      |                |
| <b>2</b>        | <b>3 - 4</b> | <ul style="list-style-type: none"> <li>• a simple explanation that links two different structures in the heart to their function e.g. right ventricle pumps blood to the lungs AND atria receive blood</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>                                                                                                                                         |                |
| <b>3</b>        | <b>5 - 6</b> | <ul style="list-style-type: none"> <li>• a detailed explanation that covers most of the indicative content and that includes at least three different structures linked to their function</li> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>                                                                                                                                                                                |                |

| Question Number | Answer   | Acceptable answers | Mark       |
|-----------------|----------|--------------------|------------|
| <b>6(a)(i)</b>  | <b>B</b> |                    | <b>(1)</b> |

| Question Number | Answer                                                                                                                                                                                                                    | Acceptable answers | Mark       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------|
| <b>6(a)(ii)</b> | <p>A explanation that includes any two of the following points</p> <ul style="list-style-type: none"> <li>contains chloroplasts (1)</li> <li>containing chlorophyll (1)</li> <li>which absorb light energy (1)</li> </ul> |                    | <b>(2)</b> |

| Question Number | Answer                                                                            | Acceptable answers       | Mark       |
|-----------------|-----------------------------------------------------------------------------------|--------------------------|------------|
| <b>6(b)(i)</b>  | <ul style="list-style-type: none"> <li>Any value between 24 °C to 28°C</li> </ul> | units (°C) must be given | <b>(1)</b> |

| Question Number | Answer                                                                                                                                                                                                                                                                                 | Acceptable answers | Mark       |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------|
| <b>6(b)(ii)</b> | <p>A description that includes two of the following:</p> <ul style="list-style-type: none"> <li>named limiting factor e.g water, carbon dioxide, light (1)</li> <li>described effect on rate of photosynthesis e.g (lower light intensity) lower rate of photosynthesis (1)</li> </ul> | ORA                | <b>(2)</b> |

| Question Number |              | Indicative Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Mark       |
|-----------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>QWC</b>      | <b>*6(c)</b> | <p>A description including some of the following points in a logical sequence</p> <ul style="list-style-type: none"> <li>• (water moves into) root hair cells</li> <li>• by osmosis</li> <li>• from a high concentration (of water)</li> <li>• to a low concentration (of water)</li> <li>• down a concentration gradient</li> <li>• through a partially permeable membrane</li> <li>• through xylem vessels</li> <li>• by capillary action</li> <li>• (into leaves) and out through the stomata</li> <li>• reference to transpiration/transpiration stream</li> </ul> | <b>(6)</b> |
| <b>Level</b>    | <b>0</b>     | No rewardable content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |
| <b>1</b>        | <b>1 - 2</b> | <ul style="list-style-type: none"> <li>• a limited description of how water enters the plant <b>OR</b> how water moves through the plant e.g. water goes into the roots from the soil <b>OR</b> water goes up the stem</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>                                                                                                                                                   |            |
| <b>2</b>        | <b>3 - 4</b> | <ul style="list-style-type: none"> <li>• a simple description that includes a reference to root hair cells <b>OR</b> xylem vessels <b>OR</b> osmosis in the correct context.</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>                                                                                                                                                              |            |
| <b>3</b>        | <b>5 - 6</b> | <ul style="list-style-type: none"> <li>• a detailed description that includes a reference to root hair cells <b>AND</b> xylem vessels <b>AND</b> osmosis in the correct context.</li> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>                                                                                                                                                                                    |            |



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