

# Mark Scheme (Results)

March 2013

GCSE Biology  
5BI2H/01

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March 2013

Publications Code UG035095

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

Question Number	Answer	Acceptable answers	Mark
<b>1(a)(ii)</b>	Any two from the following: <ul style="list-style-type: none"> <li>• diffusion (1)</li> <li>• from an area of high concentration to an area of low concentration/down a concentration gradient (1)</li> <li>• through stoma / stomata (1)</li> </ul>	Accept pores / between guard cells Ignore through guard cells	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(a)(iii)</b>	Any three from the following: <ul style="list-style-type: none"> <li>• (by) photosynthesis (1)</li> <li>• ref to chloroplast / chlorophyll (1)</li> <li>• requires carbon dioxide and water (1)</li> <li>• light (energy) needed (for photosynthesis)(1)</li> <li>• (to produce) glucose (1)</li> </ul>	Ignore incorrect balancing of equations throughout Reject (and) respiration Accept if written on arrow in word / formula equation Accept correct formulae word / formula equation Accept if written on arrow in word / formula equation Reject energy is created / produced Accept sugar from word / formula equation	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(b)</b>	water _____ osmosis (1)	3 lines, 1 correct = 0 mark 3 lines, 2 correct = 1 mark 4 lines, 1 correct = 0 mark 4 lines, 2 correct = 0 mark	

	mineral ions active transport (1)		<b>(2)</b>
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Question Number	Answer	Acceptable answers	Mark
<b>2(a)(i)</b>	<ul style="list-style-type: none"> <li>height / growth increases until 15/18 (years old) (1)</li> <li>height / growth starts to level off / plateau / slows down after 15/18 (1)</li> </ul>	Accept increases and then levels off / height increases (until 20) for 1 mark  ecf on figures quoted Accept growth stops after 18	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(ii)</b>	<ul style="list-style-type: none"> <li>155 / 155.5 – 132 / 132.5 (cm) (1)</li> <li>answer between 22 and 23.5 (cm) (1)</li> </ul>	Two marks for correct bald answer  ecf 2 marks cannot be awarded if mp 1 not correct	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(iii)</b>	An explanation linking two points <ul style="list-style-type: none"> <li>95% will be smaller / that height or smaller</li> </ul> OR <ul style="list-style-type: none"> <li>5% will be taller / at that height or taller (1)</li> <li>at that age (1)</li> </ul>		<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)(i)</b>	transcription (1)	Accept phonetic spelling	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)(ii)</b>	A		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)(i)</b>	<ul style="list-style-type: none"> <li>• (heart rate =)198 to 200 (1)</li> <li>• (0.18 x 198 to 200 = ) 35.6 to 36 (1)</li> </ul>	2 marks for correct bald answer ecf	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)(ii)</b>	B - 12.8 mmol dm <sup>-3</sup>		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)(iii)</b>	D - the concentration of lactic acid is not dependent on heart rate		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)(iv)</b>	<p>Any three from the following:</p> <ul style="list-style-type: none"> <li>• lactic acid increases / <b>more</b> lactic acid produced (as exercise increases) (1)</li> <li>• using more energy /muscles working / contracting harder / faster (1)</li> <li>• <u>aerobic</u> respiration at its maximum (rate) (1)</li> <li>• as oxygen not supplied fast enough / muscles not getting enough oxygen (1)</li> <li>• <u>anaerobic</u> respiration occurs (producing lactic acid) (1)</li> </ul>	<p>Accept stops Ignore breathing</p> <p>Accept body Accept not enough oxygen /oxygenated blood</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b)</b>	Any three from the following: <ul style="list-style-type: none"> <li>• (concentration of lactic acid) decreases (1)</li> <li>• lactic acid broken down(1)</li> <li>• using oxygen / oxidised(1)</li> <li>• into carbon dioxide and water (1)</li> <li>• ref to oxygen debt / EPOC (1)</li> </ul>	Accept amount  Accept if written in a word or formula equation for MP3 and MP4	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(a)</b>	<p>A suggestion including any three linked points</p> <ul style="list-style-type: none"> <li>• ref to use of enzymes (1)</li> <li>• isolate / remove /cut out gene / DNA (for resistance)(1)</li> <li>• (coding for) enzyme (1)</li> <li>• from bacteria (1)</li> <li>• insertion of gene / DNA into crops / plants (1)</li> </ul>	<p>Any named enzyme must be in correct context.</p> <p>Ignore plasmids</p> <p>Reject replace</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)</b>	<ul style="list-style-type: none"> <li>• in the phloem (1)</li> </ul>	<p>Accept phonetic spelling e.g. phloem /flowem</p>	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(c)(i)</b>	<p>A description including two of the following points</p> <ul style="list-style-type: none"> <li>• 0 to 10/11 no effect / change / difference (1)</li> <li>• 10/11 to 28 / 29/30 decrease in mass / yield (1)</li> <li>• Over 28 / 29/30 no change (1)</li> </ul>	<p>Accept decreases for 1 mark (if no other marks awarded)</p> <p>ecf throughout</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(c)(ii)</b>	B - 30 arbitrary units		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(d)(i)</b>	<ul style="list-style-type: none"> <li>number of <b>species</b> increase / go up (1)</li> </ul>	Ignore number of weeds	<b>(1)</b>

Question Number	Answers	Acceptable answers	Mark
<b>4(d)(ii)</b>	<p>Suggestions including two of the following linked points</p> <ul style="list-style-type: none"> <li>increased use of herbicide-resistant crops (1)</li> <li>increased use (concentration / time) of herbicide (1)</li> <li>ref to transfer of genes into weeds from other plants / cross pollination (1)</li> <li>mutation(1)</li> </ul>	<p>Ignore ref to evolution / natural selection</p> <p>Ignore immune (to herbicide)</p> <p>Accept a description eg continued use of herbicide</p> <p>Accept cross breeding / reproduction / contamination</p>	<b>(2)</b>



Question Number	Answer	Acceptable answers	Mark
<b>5(a)</b>	<b>C</b> peristalsis		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(b)</b>	<ul style="list-style-type: none"> <li>• neutralisation (of stomach acid) / raise pH (1)</li> <li>• emulsification / break down of fats (1)</li> </ul>	<p>Accept makes stomach / intestine contents more alkaline</p> <p>Accept breaks down large droplets / globules / increases surface area of fats</p> <p>Reject molecules broken down</p>	<b>(2)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>*5(c)</b>	<p>A description including some of the following points in a logical sequence</p> <p>Names of enzymes:</p> <ul style="list-style-type: none"> <li>• carbohydrases</li> <li>• named carbohydrase eg amylase</li> <li>• proteases</li> <li>• named protease eg pepsin</li> <li>• lipases</li> <li>• named lipase</li> </ul> <p>General points about enzyme action:</p> <ul style="list-style-type: none"> <li>• breakdown of large / insoluble / named molecules into small / soluble / named molecules</li> <li>• for absorption</li> <li>• catalysts</li> <li>• speeds up reactions</li> <li>• active sites that bind to substrate</li> <li>• idea of specificity</li> </ul> <p>Specific points:</p> <ul style="list-style-type: none"> <li>• carbohydrates/ starch are broken down</li> <li>• into sugars / glucose</li> <li>• proteins /named protein are broken down</li> <li>• into amino acids</li> <li>• fats / oils / lipids / named lipid are broken down</li> <li>• into fatty acids /glycerol</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 enzyme action that includes at least three points</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 of enzyme action that includes at least six points</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 of at least nine points</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>5(d)</b>	<p>An explanation linking three of the following points</p> <ul style="list-style-type: none"> <li>• (E) more /fast / maximises diffusion / absorption (1)</li> <li>• (S) microvilli (1)</li> <li>• (E) large surface area (1)</li> <li>• (S) single layer of cells / one cell thick / thin walls (1)</li> <li>• (E) small diffusion distance (1)</li> <li>• (S) capillary network / good blood supply / capillaries inside villus (1)</li> <li>• (E) maintains diffusion gradient (1)</li> </ul>	<p>To award all three marks at least one structure (S) and explanation (E) must be linked together.</p> <p>Award once, linked to any structure Ignore efficient (in stem) / easier</p> <p>Reject ref to cell wall</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(a)</b>	<p>A description including the following linked points</p> <ul style="list-style-type: none"> <li>• ref to a gene (coding for protein)(1)</li> <li>• sequence of bases determines sequence of amino acids (1)</li> <li>• idea of one code / triplet / codon / 3 bases (for one amino acid) (1)</li> <li>• several amino acids make up a protein / (poly)peptide (1)</li> <li>• transcription / detail of transcription (1)</li> <li>• translation / detail of translation (1)</li> </ul>	<p>Accept on either DNA or RNA base pairs</p> <p>Accept a chain of amino acids</p> <p>eg mRNA made</p> <p>eg mRNA attached to ribosome</p>	<b>(4)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>*6(b)</b>	<p>A description including some of the following points in a logical sequence</p> <p>Points relating to DNA structural features:</p> <ul style="list-style-type: none"> <li>• two strands</li> <li>• double helix</li> <li>• (contains) bases</li> <li>• A, T, C, G</li> <li>• adenine / A paired with thymine / T</li> <li>• guanine / G paired with cytosine / C</li> <li>• hydrogen / H bonds joining bases</li> </ul> <p>Contributions from Scientists:</p> <ul style="list-style-type: none"> <li>• X-ray (crystallography) being used</li> <li>• to show helical structure</li> <li>• to show diameter of molecule</li>   <li>• how base pairs are arranged was shown</li> <li>• how strands are arranged was shown</li> <li>• modelling</li>   <li>• reference to using other people's ideas</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 that includes either: at least <b>three</b> DNA features <b>OR one</b> contribution</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 at least <b>three</b> features of DNA and at least <b>one</b> contribution <b>OR two</b> features of DNA and <b>two</b> contributions.</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 of the structure of DNA that includes at least <b>three</b> features and <b>two</b> contributions.</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(c)</b>	<p>An explanation to include two of the following points linked together</p> <ul style="list-style-type: none"> <li>• genes / base sequence (on human chromosome) identified (1)</li> <li>• identification of faulty / mutated genes (1)</li> <li>• people can be tested for a genetic disorder (1)</li> <li>• ref to development of gene therapy (1)</li> <li>• idea that appropriate /early /personalised / genomic medication / counselling can be given (1)</li> </ul>	<p>Accept base pair sequence gene map</p> <p>Accept idea that genes can be linked to disease</p> <p>Accept diagnosis of cancer</p> <p>Accept a description of gene therapy</p>	<b>(2)</b>



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Order Code UG035095 March 2013

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