

# Mark Scheme (Results)

March 2013

GCSE Biology  
5BI1H/01

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Question Number	Answer	Acceptable answers	Mark
<b>1a(i)</b>	A – nucleus (1) B – myelin (sheath) (1) C – axon (1)	A – cell body B – Schwann cell / fatty layer	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1a(ii)</b>	C - effectors		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1b(i)</b>	$(67 + 60 + 62) = 189$ (1) $(189) / 3 \text{ ans} = 63$ (ms) (1)	Two marks for correct bald answer  ECF for incorrect calculation carried out correctly.	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1b(ii)</b>	An explanation to include the following points:  alcohol is a depressant (1)  slows down the activity of the brain (1)  (slows down) neurotransmission (1)  (slows down) transmission at the synapse (1)	<b>Reject</b> stimulant (no further marks awarded)  <b>Ignore</b> references to CNS  accept sedative  accept: slows reactions / reactions take longer / reaction time increases	<b>(2)</b>

Total for question 1 = 8 marks

Question Number	Answer	Acceptable answers	Mark
<b>2a(i)</b>	Genus – Geospiza Species -conirostris	<b>accept geospiza</b> <b>accept Conirostris</b>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2a(ii)</b>	A suggestion including two of the following: <ul style="list-style-type: none"> <li>• (different beak sizes/adapted) enable different finches to feed on different food types (1)</li> <li>• less competition between species (1)</li> </ul>	eat different foods accept comparison between 2 beaks and food source  more species are able to co-exist (1)	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2a(iii)</b>	<b>B</b> <input checked="" type="checkbox"/> geographic isolation		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2b</b>	<p>A suggestion linking <b>three</b> of the following points:</p> <ul style="list-style-type: none"> <li>• variation between species/ beak sizes/ shapes (1)</li> <li>• due to mutation(1)</li> <li>• competition for resources (1)</li> <li>• survival of the fittest /those best adapted to the environment survived (1)</li> <li>• those who survive pass their genes/characteristics onto their offspring (1)</li> <li>• natural selection (1)</li> </ul>		<b>(3)</b>

Total for question 2 – 8 marks

Question Number	Answer	Acceptable answers	Mark
<b>3a(i)</b>	<b>C</b> <input checked="" type="checkbox"/> nitrification		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3a(ii)</b>	<p>an explanation to include the following points</p> <ul style="list-style-type: none"> <li>used to make protein (1)</li> <li>for growth (1)</li> </ul>	<p><b>Ignore references to use as food (plants do not feed)</b></p> <p>accept amino acids/ chlorophyll /DNA</p> <p>ignore references to photosynthesis / respiration</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3a(iii)</b>	<p>A description linking <b>four</b> of the following points</p> <p>(nitrates) leach/flow into water (1)</p> <p>algae and small plants grow <b>rapidly</b> /algal bloom (1)</p> <p><b>underwater</b> plants cannot photosynthesise (1)</p> <p>(lack of photosynthesis / sunlight) causes plants to die (1)</p> <p>decomposers / (decomposing) bacteria break down the dead material / plants (1)</p> <p>these bacteria use up oxygen during respiration(1)</p>	accept fertilisers for nitrates	<b>(4)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3b</b>	<p>An explanation to include three of the following points</p> <p>bacteria use nitrogen / nitrogen fixing bacteria (1)</p> <p>make ammonia / ammonium / nitrogen compounds / nitrates for use by plants (1)</p> <p>bacteria protected (within the root nodule) (1)</p> <p>bacteria obtain chemical substances / glucose / sugar from the plant (1)</p> <p>this is called a mutualism / symbiosis(1)</p>	<p><b>Ignore food/nutrients</b></p> <p><b>reject parasitism</b></p>	<b>(3)</b>

Total for question 3 = 10 marks

Question Number	Answer	Acceptable answers	Mark
<b>4(a)(i)</b>	<p>A description including the following points:</p> <ul style="list-style-type: none"> <li>• as mean mass increases so does the percentage of population with type 2 diabetes (1)</li> <li>• correct readings from the graph to illustrate the comparative point (1)</li> </ul>	<b>accept</b> positive correlation ORA	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(a)(ii)</b>	<p>A suggestion linking <b>two</b> of the following:</p> <ul style="list-style-type: none"> <li>• increasing body mass leads to over weight / obesity</li> <li>• don't respond to insulin / reference to insulin resistance</li> </ul>		<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)(i)</b>	<p>Calculation</p> $(1.7 \times 1.7) = 2.89 \text{ (1)}$ $78 / 2.89$ $= 27 \text{ (1)}$	<p>Two marks for correct bald answer</p> <p>Ecf for incorrect numbers but correct calculation</p> <p>26.98 / 26.9</p> <p>Accept continued decimal places</p>	<b>(2)</b>



Question Number	Answer	Acceptable answers	Mark
<b>4(b)(ii)</b>	<b>C</b> <input checked="" type="checkbox"/> overweight		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(c)</b>	<p>A description linking <b>three</b> of the following:</p> <ul style="list-style-type: none"> <li>• glucagon is released (1)</li> <li>• from the pancreas (1)</li> <li>• glycogen to glucose (1)</li> <li>• in the liver / muscle cells(1)</li> <li>• which acts to raise blood glucose levels (1)</li> </ul>	<p>correct spelling of glycogen and glucagon only</p> <p>No mark for glucagon is injected</p> <p>Ignore references to glucagon turning into glucose</p>	<b>(3)</b>

Total for question 4 – 10 marks

Question Number	Answer	Acceptable answers	Mark
<b>5(a)(i)</b>	<b>D</b> <input checked="" type="checkbox"/> positive phototropism		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(a)(ii)</b>	An explanation to include the following linked points  (auxins) move to the shaded side of a shoot (1)  causing cells on the shaded side to <u>elongate</u> (1)	accept move to the side opposite the light  accept get longer for elongate Ignore references to cell division	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(b)(i)</b>	there is an increase in the % of bananas that ripen as the ethylene concentration increases	Ignore positive effect	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(b)(ii)</b>	An explanation to include two of the following points <ul style="list-style-type: none"> <li>• concentration of ethylene to use is 3% (1)</li> <li>• would be more expensive to increase the ethylene concentration above 3%</li> <li>• when there is no added ripening benefits past 3%(1)</li> <li>• below 3% not all bananas are ripe (1)</li> </ul>	Do not credit ideas related to longer shelf life as the question asks about ripening	<b>(2)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>*5(c)</b>	<p>A description to include some of the following points</p> <ul style="list-style-type: none"> <li>• selective weedkillers</li> <li>• allows broad-leaved plants to grow uncontrollably and die</li> <li>• narrower-leaved plants and crops left unaffected</li> <li>• auxins and or gibberellins are used</li> </ul> <ul style="list-style-type: none"> <li>• rooting powders</li> <li>• plant cuttings are dipped into rooting powder</li> <li>• roots develop rapidly</li> <li>• large number of plants can be produced from the same plant</li> <li>• no need to wait for plants to grow from seeds</li> <li>• auxins are used</li> </ul> <ul style="list-style-type: none"> <li>• seedless fruit production</li> <li>• the fruit will develop but the seeds inside will not</li> <li>• fruits are able to grow larger (larger biomass)</li> <li>• gibberellins are used</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 at least one use of plant hormones</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 two or more uses of plant hormones</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 two or more uses of plant hormones with at least auxin, gibberellins or other relevant hormone 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>	

Total for question 5 = 12 marks

Question Number	Answer	Acceptable answers	Mark
<b>6(a)(i)</b>	75%		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(a)(ii)</b>	<p>An explanation linking <b>two</b> of the following:</p> <ul style="list-style-type: none"> <li>• Punnett square would predict 50% normal 50% carrier (1)</li> <li>• actual offspring are not 50% carrier (1)</li> <li>• the probability is applied to each child not the overall offspring (1)</li> </ul>	<p>accept ratios or probabilities instead of percentages</p> <p>actual offspring are 75%</p> <p>accept references to random assortment</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark									
<b>6(a)(iii)</b>	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>b</td> <td>b</td> </tr> <tr> <td>B</td> <td>Bb</td> <td>Bb</td> </tr> <tr> <td>b</td> <td>bb</td> <td>bb</td> </tr> </table> <p>Probability = 50%</p> <p>Ratio 2/4, 2:2, can be given for probability</p> <p>1 mark for correct gametes</p> <p>1 mark for completed Punnett square with correct probability</p>		b	b	B	Bb	Bb	b	bb	bb	<p>Accept reverse order for gametes</p> <p>Accept letters other than B/b (but alleles must be the same letter)</p> <p>50% mark can only be given if 50% of the offspring are homozygous recessive</p>	<b>(2)</b>
	b	b										
B	Bb	Bb										
b	bb	bb										

Question Number	Answer	Acceptable answers	Mark
<b>6(a)(iv)</b>	<b>A</b> <input checked="" type="checkbox"/> homozygous dominant (BB)		<b>(1)</b>

Question Number	Indicative Content	Mark									
<b>QWC</b>	<p><b>*6(b)</b> A explanation to include some of the following points:</p> <p>Pedigree analysis would show the likelihood of their offspring inheriting the disorder</p> <p>Pedigree analysis should also be carried out on the partners of the third generation.</p> <ul style="list-style-type: none"> <li>• X is not a carrier</li> <li>• X is homozygous dominant</li> <li>• and does not have sickle cell disease</li> <li>• The parents of X are heterozygous / his sister has sickle cell</li> <li>• so will not pass on the allele for the disease to offspring</li> <li>• if his partner is a carrier</li> <li>• there will be a 50% chance of the child being a carrier</li>   <li>• Y and Z are carriers of the sickle cell allele</li> <li>• Y and Z are heterozygous</li> <li>• The mother of Y has sickle cell / Y will inherit the sickle cell allele</li> <li>• The parents of Z do not have sickle cell / mother is a carrier/heterozygous</li> <li>• They have a 50% chance of passing the sickle cell allele onto their potential offspring</li> <li>• If their partners were also carriers</li> <li>• There would be a 25% chance that the offspring will have the sickle cell disease</li> <li>• There would be a 50% chance that the offspring would also carry the allele for sickle cell disease</li> </ul> <p>Example Punnett square:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>B</td> <td>b</td> </tr> <tr> <td>B</td> <td>BB</td> <td>Bb</td> </tr> <tr> <td>b</td> <td>Bb</td> <td>bb</td> </tr> </table>		B	b	B	BB	Bb	b	Bb	bb	<b>(6)</b>
	B	b									
B	BB	Bb									
b	Bb	bb									
<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 the genetic profile of X,Y and Z or an explanation of the use of pedigree analysis</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 of the genetic profile of X, Y and Z and an explanation of the use of pedigree analysis</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 of the genetic profile of X, Y and Z and explanation of the use of pedigree analysis plus either an explanation of one genotype or a prediction of one of the offspring outcomes</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>									

Total for Question 6 – 12 marks

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