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# Mark Scheme (Results)

## March 2013

GCSE Biology
5BI1H/01

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

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **1a(ii)** | C - effectors | | **(1)** |

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

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

Total for question 1 = 8 marks

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

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **2a(ii)** | A suggestion including two of the following:<br><br>• (different beak sizes/adapted) enable different finches to feed on different food types (1)<br><br>• less competition between species (1) | eat different foods<br>accept comparison between 2 beaks and food source<br><br>more species are able to co-exist (1) | **(2)** |

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **2a(iii)** | **B** ☒ geographic isolation | | **(1)** |

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **2b** | A suggestion linking **three** of the following points:<br>• variation between species/ beak sizes/ shapes (1)<br>• due to mutation(1)<br>• competition for resources (1)<br>• survival of the fittest /those best adapted to the environment survived (1)<br>• those who survive pass their genes/characteristics onto their offspring (1)<br>• natural selection (1) | | **(3)** |

Total for question 2 – 8 marks

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **3a(i)** | **C** ☒ nitrification | | **(1)** |

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **3a(ii)** | an explanation to include the following points<br><br>• used to make protein (1)<br><br>• for growth (1) | **Ignore references to use as food (plants do not feed)**<br><br>accept amino acids/ chlorophyll /DNA<br><br>ignore references to photosynthesis / respiration | **(2)** |

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

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

Total for question 3 = 10 marks

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **4(a)(i)** | A description including the following points:<br><br>• as mean mass increases so does the percentage of population with type 2 diabetes (1)<br><br>• correct readings from the graph to illustrate the comparative point (1) | **accept** positive correlation<br>ORA | **(2)** |

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **4(a)(ii)** | A suggestion linking **two** of the following:<br><br>• increasing body mass leads to over weight / obesity<br><br>• don't respond to insulin / reference to insulin resistance | | **(2)** |

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **4(b)(i)** | Calculation<br><br>(1.7 x 1.7) = 2.89 (1)<br><br>78 / 2.89<br><br>= 27 (1) | Two marks for correct bald answer<br><br>Ecf for incorrect numbers but correct calculation<br><br>26.98 / 26.9<br>Accept continued decimal places | **(2)** |

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **4(b)(ii)** | **C** ☒ overweight | | **(1)** |

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **4(c)** | A description linking **three** of the following:<br><br>• glucagon is released (1)<br>• from the pancreas (1)<br>• glycogen to glucose (1)<br>• in the liver / muscle cells(1)<br>• which acts to raise blood glucose levels (1) | correct spelling of glycogen and glucagon only<br><br>No mark for glucagon is injected<br><br>Ignore references to glucagon turning into glucose | **(3)** |

Total for question 4 – 10 marks

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **5(a)(i)** | **D** ☒ positive phototropism | | **(1)** |

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

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

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **5(b)(ii)** | An explanation to include two of the following points<br><br>• concentration of ethylene to use is 3% (1)<br><br>• would be more expensive to increase the ethylene concentration above 3%<br><br>• when there is no added ripening benefits past 3%(1)<br><br>• below 3% not all bananas are ripe (1) | <br><br><br><br><br><br><br><br>Do not credit ideas related to longer shelf life as the question asks about ripening | **(2)** |

| Question Number | | Indicative Content | Mark |
|---|---|---|---|
| **QWC** | ***5(c)** | A description to include some of the following points<br><br>• selective weedkillers<br>• allows broad-leaved plants to grow uncontrollably and die<br>• narrower-leaved plants and crops left unaffected<br>• auxins and or gibberellins are used<br><br>• rooting powders<br>• plant cuttings are dipped into rooting powder<br>• roots develop rapidly<br>• large number of plants can be produced from the same plant<br>• no need to wait for plants to grow from seeds<br>• auxins are used<br><br>• seedless fruit production<br>• the fruit will develop but the seeds inside will not<br>• fruits are able to grow larger (larger biomass)<br>• gibberellins are used | **(6)** |
| **Level** | **0** | No rewardable content | |
| **1** | **1 - 2** | • a limited description of at least one use of plant hormones<br>• the answer communicates ideas using simple language and uses limited scientific terminology<br>• spelling, punctuation and grammar are used with limited accuracy | |
| **2** | **3 - 4** | • a simple description of two or more uses of plant hormones<br>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately<br>• spelling, punctuation and grammar are used with some accuracy | |
| **3** | **5 - 6** | • a detailed description of two or more uses of plant hormones with at least auxin, gibberellins or other relevant hormone in the correct context<br>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately<br>• spelling, punctuation and grammar are used with few errors | |

Total for question 5 = 12 marks

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **6(a)(i)** | 75% | | **(1)** |

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **6(a)(ii)** | An explanation linking **two** of the following:<br>• Punnett square would predict 50% normal 50% carrier (1)<br>• actual offspring are not 50% carrier (1)<br>• the probability is applied to each child not the overall offspring (1) | accept ratios or probabilities instead of percentages<br>actual offspring are 75%<br>accept references to random assortment | **(2)** |

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **6(a)(iii)** | <table><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><br>Probability = 50%<br>Ratio 2/4, 2:2, can be given for probability<br>1 mark for correct gametes<br>1 mark for completed Punnett square with correct probability | Accept reverse order for gametes<br>Accept letters other than B/b (but alleles must be the same letter)<br>50% mark can only be given if 50% of the offspring are homozygous recessive | **(2)** |

| Question Number | Answer | Acceptable answers | Mark |
|---|---|---|---|
| **6(a)(iv)** | **A** ☒ homozygous dominant (BB) | | **(1)** |

<table>
<tr><th colspan="2">Question Number</th><th>Indicative Content</th><th>Mark</th></tr>
<tr><td>QWC</td><td>*6(b)</td><td>A explanation to include some of the following points:<br><br>Pedigree analysis would show the likelihood of their offspring inheriting the disorder<br>Pedigree analysis should also be carried out on the partners of the third generation.<br>• X is not a carrier<br>• X is homozygous dominant<br>• and does not have sickle cell disease<br>• The parents of X are heterozygous / his sister has sickle cell<br>• so will not pass on the allele for the disease to offspring<br>• if his partner is a carrier<br>• there will be a 50% chance of the child being a carrier<br><br>• Y and Z are carriers of the sickle cell allele<br>• Y and Z are heterozygous<br>• The mother of Y has sickle cell / Y will inherit the sickle cell allele<br>• The parents of Z do not have sickle cell / mother is a carrier/heterozygous<br>• They have a 50% chance of passing the sickle cell allele onto their potential offspring<br>• If their partners were also carriers<br>• There would be a 25% chance that the offspring will have the sickle cell disease<br>• There would be a 50% chance that the offspring would also carry the allele for sickle cell disease<br>Example Punnett square:<br><br><table><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></td><td>(6)</td></tr>
<tr><td>Level</td><td>0</td><td colspan="2">No rewardable content</td></tr>
<tr><td>1</td><td>1 - 2</td><td colspan="2">• a limited explanation the genetic profile of X,Y and Z or an explanation of the use of pedigree analysis<br>• the answer communicates ideas using simple language and uses limited scientific terminology<br>• spelling, punctuation and grammar are used with limited accuracy</td></tr>
<tr><td>2</td><td>3 - 4</td><td colspan="2">• A simple explanation of the genetic profile of X, Y and Z and an explanation of the use of pedigree analysis<br>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately<br>• spelling, punctuation and grammar are used with some accuracy</td></tr>
<tr><td>3</td><td>5 - 6</td><td colspan="2">• 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<br>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately<br>• spelling, punctuation and grammar are used with few errors</td></tr>
</table>

Total for Question 6 – 12 marks

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