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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) B – myelin (sheath) (1) C – axon (1)	A – cell body 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) (189) / 3 ans = 63 (ms) (1)	Two marks for correct bald answer ECF for incorrect calculation carried out correctly.	**(2)**

Question Number	Answer	Acceptable answers	Mark
1b(ii)	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)	**Reject** stimulant (no further marks awarded) **Ignore** references to CNS accept sedative 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 Species -conirostris	**accept geospiza** **accept Conirostris**	**(2)**

Question Number	Answer	Acceptable answers	Mark
2a(ii)	A suggestion including two of the following: • (different beak sizes/adapted) enable different finches to feed on different food types (1) • less competition between species (1)	eat different foods accept comparison between 2 beaks and food source 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: • variation between species/ beak sizes/ shapes (1) • due to mutation(1) • competition for resources (1) • survival of the fittest /those best adapted to the environment survived (1) • those who survive pass their genes/characteristics onto their offspring (1) • 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 • used to make protein (1) • for growth (1)	**Ignore references to use as food (plants do not feed)** accept amino acids/ chlorophyll /DNA ignore references to photosynthesis / respiration	**(2)**

Question Number	Answer	Acceptable answers	Mark
3a(iii)	A description linking **four** of the following points (nitrates) leach/flow into water (1) algae and small plants grow **rapidly** /algal bloom (1) **underwater** plants cannot photosynthesise (1) (lack of photosynthesis / sunlight) causes plants to die (1) decomposers / (decomposing) bacteria break down the dead material / plants (1) 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 bacteria use nitrogen / nitrogen fixing bacteria (1) make ammonia / ammonium / nitrogen compounds /nitrates for use by plants (1) bacteria protected (within the root nodule) (1) bacteria obtain chemical substances / glucose / sugar from the plant (1) this is called a mutualism / symbiosis(1)	**Ignore food / nutrients** **reject parasitism**	**(3)**

Total for question 3 = 10 marks

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

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

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	Calculation (1.7 x 1.7) = 2.89 (1) 78 / 2.89 = 27 (1)	Two marks for correct bald answer Ecf for incorrect numbers but correct calculation 26.98 / 26.9 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: • glucagon is released (1) • from the pancreas (1) • glycogen to glucose (1) • in the liver / muscle cells(1) • which acts to raise blood glucose levels (1)	correct spelling of glycogen and glucagon only No mark for glucagon is injected 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 (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	**(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 • concentration of ethylene to use is 3% (1) • would be more expensive to increase the ethylene concentration above 3% • when there is no added ripening benefits past 3%(1) • below 3% not all bananas are ripe (1)	 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 • selective weedkillers • allows broad-leaved plants to grow uncontrollably and die • narrower-leaved plants and crops left unaffected • auxins and or gibberellins are used • rooting powders • plant cuttings are dipped into rooting powder • roots develop rapidly • large number of plants can be produced from the same plant • no need to wait for plants to grow from seeds • auxins are used • seedless fruit production • the fruit will develop but the seeds inside will not • fruits are able to grow larger (larger biomass) • gibberellins are used	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited description of at least one use of plant hormones • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple description of two or more uses of plant hormones • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • 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 • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • 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: • Punnett square would predict 50% normal 50% carrier (1) • actual offspring are not 50% carrier (1) • the probability is applied to each child not the overall offspring (1)	accept ratios or probabilities instead of percentages actual offspring are 75% 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> Probability = 50% Ratio 2/4, 2:2, can be given for probability 1 mark for correct gametes 1 mark for completed Punnett square with correct probability	Accept reverse order for gametes Accept letters other than B/b (but alleles must be the same letter) 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:

Pedigree analysis would show the likelihood of their offspring inheriting the disorder
Pedigree analysis should also be carried out on the partners of the third generation.
• X is not a carrier
• X is homozygous dominant
• and does not have sickle cell disease
• The parents of X are heterozygous / his sister has sickle cell
• so will not pass on the allele for the disease to offspring
• if his partner is a carrier
• there will be a 50% chance of the child being a carrier

• Y and Z are carriers of the sickle cell allele
• Y and Z are heterozygous
• The mother of Y has sickle cell / Y will inherit the sickle cell allele
• The parents of Z do not have sickle cell / mother is a carrier/heterozygous
• They have a 50% chance of passing the sickle cell allele onto their potential offspring
• If their partners were also carriers
• There would be a 25% chance that the offspring will have the sickle cell disease
• There would be a 50% chance that the offspring would also carry the allele for sickle cell disease
Example Punnett square:

<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
• the answer communicates ideas using simple language and uses limited scientific terminology
• 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
• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately
• 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
• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately
• spelling, punctuation and grammar are used with few errors</td></tr>
</table>

Total for Question 6 – 12 marks

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