

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) $(189) / 3 \text{ ans} = 63 \text{ (ms)}$ (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 $(1.7 \times 1.7) = 2.89 \text{ (1)}$ $78 / 2.89$ $= 27 \text{ (1)}$	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 border="1"><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		b	b	B	Bb	Bb	b	bb	bb	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)
	b	b										
B	Bb	Bb										
b	bb	bb										

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

Question Number		Indicative Content	Mark									
QWC	*6(b)	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>		B	b	B	BB	Bb	b	Bb	bb	(6)
	B	b										
B	BB	Bb										
b	Bb	bb										
Level	0	No rewardable content										
1	1 - 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										
2	3 - 4	• 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										
3	5 - 6	• 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										

Total for Question 6 – 12 marks

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