

Mark Scheme (Results)

November 2011

GCSE Biology
5BI1H/01

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Question Number	Answer	Acceptable answers	Mark
1(a)	C (1) least amount of freshwater shrimps found at C (1)	Reference to freshwater shrimps as indicator species freshwater shrimps can only survive in clean water / cannot survive in polluted water more shrimps die in polluted water	(2)

Question Number	Answer	Acceptable answers	Mark
1(b)	D		(1)

Question Number	Answer	Acceptable answers	Mark
1(c)	C		(1)

Question Number	Answer	Acceptable answers	Mark
1(d)	A description of the process linking four of the following points: <ul style="list-style-type: none"> • algae (on the surface) of the stream show rapid growth (1) • (they) block light to the photosynthesising plants below (1) • (causing) plants on the stream bed to die (1) • decomposers use up oxygen to break down these dead plants (1) • other organisms die due to lack of oxygen (1) 	algal bloom occurs / large increase in growth of algae / other plants grow quickly Accept microorganisms / microbes / bacteria Accept reference to anaerobic bacteria can function in anoxic conditions - not against a current marking point	(4)

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	2 / two	(offspring) 2 and 3	(1)

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	D		(1)

Question Number	Answer	Acceptable answers	Mark
2(a)(iii)	<p>An explanation linking two of the following points:</p> <ul style="list-style-type: none"> two of the offspring from generation II had CF (1) the children with cystic fibrosis must have inherited 1 recessive allele from each parent / children must have 2 recessive alleles (1) both parents must have 1 recessive allele / be carriers of the CF allele (1) 	<p>ORA if homozygous dominant then no CF offspring</p> <p>Ignore: references to genes</p> <p>ORA if homozygous recessive offspring would have CF</p>	(2)

Question Number	Answer	Acceptable answers	Mark									
2(b)	<p>correct gametes (1)</p> <p>correct offspring (1)</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	Accept bB instead of Bb	(2)
	B	b										
B	BB	Bb										
b	Bb	bb										

Question Number	Answer	Acceptable answers	Mark
2(c)	<p>An explanation linking two of the following:</p> <ul style="list-style-type: none"> • pedigree analysis will determine the likelihood that their offspring could inherit the CF allele(1) • if heterozygous there is a 50% chance (that the CF allele) will be passed on / if 2 heterozygous parents 25% chance the offspring will have CF(1) • if either parent is homozygous dominant there is 0% chance that their offspring could have the disease(1) 	<p>Accept to see if they are a carrier of the CF allele</p> <p>Accept ratios rather than percentages 2 in 4 chance</p>	(2)

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	$\frac{90}{780} = 0.115 \text{ (1)}$ $\times 100 = 11.5(\%) \text{ (1)}$	Accept 12%	(2)

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	Any two from the following points <ul style="list-style-type: none"> • respiration (1) • excretion / egestion (1) • temperature regulation (1) • movement / exercise • not all eaten (1) 	energy lost as heat	(2)

Question Number	Answer	Acceptable answers	Mark
3(b)	Any two from the following points: <ul style="list-style-type: none"> • keep them in a warm environment (1) • restrict their movement (1) • provide {high energy / low wastage / easily digestible} food (1) • treat parasites (1) 	Ignore feed more	(2)

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	C		(1)

Question Number	Answer	Acceptable answers	Mark
3(c)(ii)	<p>An explanation linking the following points:</p> <ul style="list-style-type: none"> • bacteria provides nitrates for the plants (1) • (by) nitrogen-fixation / converting nitrogen into nitrates (1) • (nitrates) provide protein / for growth (1) 	<p>Accept nitrogen-fixing bacteria</p>	<p>(3)</p>

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	650 ÷ 100 (1) x 40 = 260 (1)	10% of 650 = 65 65 x 4 = 260	(2)

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	discontinuous (variation)	Ignore genetic variation (as not shown in the graph) Accept discrete	(1)

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	C		(1)

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	A description including the following points: <ul style="list-style-type: none"> • continuous variation / data (1) • normal distribution curve (1) • correct interpretation of data from the graph (1) 	bell shaped curve e.g. most common height range 150 – 154	(3)

Question Number	Answer	Acceptable answers	Mark
4(c)	<p>An explanation linking three of the following points:</p> <ul style="list-style-type: none"> • most individuals within a population vary slightly from one another (1) • most organisms produce more young than will survive to adulthood / overproduction (1) • there is much competition within and between species (1) • those organisms with advantageous characteristics will survive (1) • the advantageous characteristics will be inherited / better adapted organisms are more likely to survive to reproduce (1) 	<p>taller animals outcompete smaller animals for food</p> <p>survival of the fittest</p> <p>the genes for the characteristics will be passed on / offspring will have the desired characteristics</p>	(3)

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	increase in CO ₂ concentration (over time)	positive correlation	(1)

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	355 ppm (1990) – 339 ppm (1980) (1) 16 (1)	Accept: tolerance 14 -18 2 marks for overall correct answer	(2)

Question Number	Answer	Acceptable answers	Mark
5(a)(iii)	Any three from the following points: <ul style="list-style-type: none"> • seasonal / weather changes (1) • due to less leaves on trees/less plants less photosynthesis and CO₂ removed from the atmosphere (1) • more fossil fuels / wood may be burned during colder weather (1) 	Accept refs to summer / winter more photosynthesis in the summer more car usage in summer / winter	(3)

Question Number	Indicative Content	Mark
QWC	<p>*5 (b)</p> <p>A description including some of the following points:</p> <ul style="list-style-type: none"> • photosynthetic material/plants will remove CO₂ from the atmosphere • these plants will use the CO₂ to make glucose • plant respiration will release CO₂ into the atmosphere • animals will eat the plants- which contain carbon • animals and plants will eventually die and decay due to microbial/bacterial action releasing CO₂ • the combustion/burning of fossil fuels will release CO₂ into the atmosphere • the burning of carbon based products made from trees will release CO₂ into the atmosphere 	(6)
Level	0	No rewardable content
1	1 - 2	<ul style="list-style-type: none"> • a limited description of one of the processes of the carbon cycle • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	3 - 4	<ul style="list-style-type: none"> • a simple description of two of the processes of the carbon cycle including one method of adding carbon dioxide and one method of removing carbon dioxide • 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	<ul style="list-style-type: none"> • a detailed description of most of the processes of the carbon cycle that releases and removes carbon dioxide • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately to describe the carbon cycle • spelling, punctuation and grammar are used with few errors

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	A		(1)

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	Hypothalamus	Accept alternative spellings e.g. hypothalamus / hyperthalamus	(1)

Question Number	Answer	Acceptable answers	Mark
6(b)	<p>A description linking two of the following points:</p> <ul style="list-style-type: none"> • erector muscles in the skin contract (1) • cause the hair to rise to trap air close to the skin to reduce heat loss / insulates skin (1) <p>OR</p> <ul style="list-style-type: none"> • sweat glands release water / sweat (1) • evaporates and cools the skin (1) <p>OR</p> <ul style="list-style-type: none"> • (brief description of) vasodilation or vasoconstriction (1) • method of control (1) 	<p>hairs on the surface of the skin stand on end</p>	(2)

Question Number	Answer	Acceptable answers	Mark
6(c)	<p>An explanation linking two of the following points</p> <ul style="list-style-type: none"> • in order for the enzymes to be most effective / best /optimum temperature for enzymes to work (1) • for chemical reactions to happen (1) • at too high temperatures enzymes are denatured (1) 	<p>Accept named enzyme</p> <p>Accept named chemical reaction</p> <p>ORA at colder temperatures enzymes are less active</p>	(2)

Question Number	Indicative Content	Mark
QWC	<p>*6(d)</p> <p>An explanation linking some of the following points:</p> <ul style="list-style-type: none"> • vasodilation and vasoconstriction help control body temperature • in vasodilation more warm blood flows near the surface of the skin • as the shunt valve stops blood flowing by another route • more heat can be radiated or convected from the skin • body temperature is reduced • in vasoconstriction less blood flows near the surface of the skin • as it flows through the shunt valve • body temperature returns to normal 	(6)
Level	0 No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> • a limited explanation of thermoregulation although the processes of vasodilation and vasoconstriction are not mentioned • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	3 - 4	<ul style="list-style-type: none"> • a simple explanation of either vasodilation or vasoconstriction this may be a description but not include the words vasodilation and vasoconstriction • 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	<ul style="list-style-type: none"> • a detailed explanation of both vasodilation and vasoconstriction including references to either the method of heat loss or the role • there is coherent flow of content and accurate use of scientific terminology to explain thermoregulation • spelling, punctuation and grammar are used with few errors

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