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Mark Scheme (Results)

November 2011

GCSE Biology
5BI1H/01

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5BI1H/01 Mark Scheme
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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: • 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)	An explanation linking **two** of the following points: • 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 **<u>allele</u>** (1)	ORA if homozygous dominant then no CF offspring Ignore: references to genes ORA if homozygous recessive offspring would have CF	**(2)**

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

Question Number	Answer	Acceptable answers	Mark
2(c)	An explanation linking **two** of the following: • 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)	Accept to see if they are a carrier of the CF allele **Accept** ratios rather than percentages 2 in 4 chance	**(2)**

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

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	Any **two** from the following points • 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: • 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)	An explanation linking the following points: • bacteria provides nitrates for the plants (1) • (by) nitrogen-fixation / converting nitrogen into nitrates (1) • (nitrates) provide protein / for growth (1)	**Accept** nitrogen-fixing bacteria	**(3)**

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: • 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)	An explanation linking **three** of the following points: • 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)	taller animals outcompete smaller animals for food survival of the fittest the genes for the characteristics will be passed on / offspring will have the desired characteristics	**(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: • seasonal / weather changes (1) • due to less leaves on trees/less plants less photosynthesis and CO_2 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	***5 (b)**	A description including some of the following points: • photosynthetic material/plants will remove CO_2 from the atmosphere • these plants will use the CO_2 to make glucose • plant respiration will release CO_2 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 CO_2 • the combustion/burning of fossil fuels will release CO_2 into the atmosphere • the burning of carbon based products made from trees will release CO_2 into the atmosphere	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• 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**	• 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**	• 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)	A description linking **two** of the following points: • 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) **OR** • sweat glands release water / sweat (1) • evaporates and cools the skin (1) **OR** • (brief description of) vasodilation or vasoconstriction (1) • method of control (1)	hairs on the surface of the skin stand on end	**(2)**

Question Number	Answer	Acceptable answers	Mark
6(c)	An explanation linking **two** of the following points • 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)	**Accept** named enzyme Accept named chemical reaction ORA at colder temperatures enzymes are less active	**(2)**

Question Number		Indicative Content	Mark
QWC	***6(d)**	An explanation linking some of the following points: • 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**	• 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**	• 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**	• 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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