



Mark Scheme (Results)

March 2012

GCSE Biology
5BI1H/01

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Question Number	Answer	Acceptable answers	Mark
1 (a) (i)	D		(1)

Question Number	Answer	Acceptable answers	Mark
1 (a) (ii)	<p>An explanation linking the following points</p> <ul style="list-style-type: none"> • nicotine (1) • addictive / causes you to want more (1) • as the receptor sites in the brain become more used to the nicotine it has less effect / increased amounts are needed for the same effect (1) 	<p>makes you crave it</p>	(2)

Question Number	Answer	Acceptable answers	Mark
1 (b)	stimulants	Accept any reasonable spelling of the term e.g. stimulents	(1)

Question Number	Answer	Acceptable answers	Mark
1 (c)	<p>An explanation linking three of the following points</p> <ul style="list-style-type: none"> • carbon monoxide binds with red blood cells (1) • containing haemoglobin (1) • this reduces the oxygen carrying capacity of the blood (1) 	<p>accept blood for red blood cells</p> <p>Accept oxyhaemoglobin</p> <p>less oxygen is carried in the blood</p> <p>Accept references to carboxyhaemoglobin</p>	(3)

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

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

Question Number	Answer	Acceptable answers	Mark
2(b)	<p>an explanation linking the following</p> <ul style="list-style-type: none"> from receptor (cells) / sense organ (1) to the {brain / spinal cord / CNS / synapse / other neurone}(1) as an <u>electrical</u> impulse (1) 	<p>Accept named sense organ</p> <p><u>electrical</u> message/signal Ignore references to current</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(c)	<p>a description including two of the following</p> <ul style="list-style-type: none"> insulates (electrical signal) (1) the axon (1) speeds up the impulse (1) 	<p>ignore protects / protection</p> <p>accept message / signal for impulse</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(d)	<p>a description including three of the following</p> <ul style="list-style-type: none"> • receptor cells (pick up a stimulus) (1) • sensory neurone sends a message to the spinal cord / relay neurone / CNS (1) • the message travels from the relay neurone / CNS / spinal cord to the motor neurone (1) • (this initiates a response) in the effector / muscle / gland (1) • message travels across synapse (by neurotransmitters) (1) 	<p>accept the correct nerve pathway diagram for 3 marks</p> <p>accept nerve for neurone</p>	(3)

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	D		(1)

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	substitution (1) $27 \div 40$ evaluation (1) 0.675×100 67.5 (%)	e.c.f from 3(a)(i) accept 68(%) for 2 marks give full marks for correct answer, no working	(2)

Question Number	Answer	Acceptable answers	Mark												
3(b)(i)	<p>gametes</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td colspan="2" style="text-align: center;">Female</td> </tr> <tr> <td></td> <td style="text-align: center;">b</td> <td style="text-align: center;">b</td> </tr> <tr> <td style="text-align: center;">B</td> <td style="text-align: center;">Bb</td> <td style="text-align: center;">Bb</td> </tr> <tr> <td style="text-align: center;">b</td> <td style="text-align: center;">bb</td> <td style="text-align: center;">bb</td> </tr> </table> <p>Male gametes</p> <p>gametes in male/female gametes headings (1)</p> <p>offspring genotypes (1)</p>		Female			b	b	B	Bb	Bb	b	bb	bb		(2)
	Female														
	b	b													
B	Bb	Bb													
b	bb	bb													

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	0.5 / 50% / 50/50 / $\frac{1}{2}$ / 2/4 / 2:2 / even chance	evens	(1)

Question Number	Answer	Acceptable answers	Mark
3(b)(iii)	homozygous recessive homozygous recessive	Accept any reasonable spelling of the term Reject heterozygous	(1)

Question Number	Answer	Acceptable answers	Mark
3 (c)	<p>an explanation linking three of the following</p> <ul style="list-style-type: none"> • speciation (1) • different geographical area may have different selection pressures / environmental conditions (1) • those individuals of a species suited /adapted / to this environment will survive and breed (1) • adaptations/genes passed down to the offspring • new species unable to breed with original (1) 	<p>named environmental conditions e.g. climate</p> <p>Accept survival of the fittest</p>	(3)

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	substitution (1) $11.8 + 10.3 + 11.2 = 33.3$ evaluation (1) $33.3 / 3 = 11.1(\text{cm})$ (1)	e.c.f if substitution answer is incorrect give full marks for correct answer, no working	(2)

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	An explanation linking the following points <ul style="list-style-type: none"> • (plant B) leaves are larger because they have a higher concentration of nitrate (1) • (nitrates are) required for making protein / growth (1) 	mean is higher as plant has more nitrates	(2)

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

Question Number	Answer	Acceptable answers	Mark
4(c)	<p>an explanation linking the following points</p> <ul style="list-style-type: none"> • nitrogen fixing bacteria (1) • fix nitrogen gas for the plant (1) • decomposing bacteria / decomposers (1) • decompose / break down animal / plant matter / protein / urea (1) • into ammonia (1) • (then) nitrifying bacteria (1) • convert ammonia / nitrites into nitrates (1) 	nitrogen fixing bacteria convert nitrogen into nitrates / nitrogen compounds (2)	(4)

Question Number	Answer	Acceptable answers	Mark
4(d)	<p>respiration / respiring / respire</p> <p>decomposition /decomposing / decompose</p>	any reasonable spelling of either term	(1)

Question Number	Answer	Acceptable answers	Mark
5 (a) (i)	B		(1)

Question Number	Answer	Acceptable answers	Mark
5 (a) (ii)	chordata	chordates accept any reasonable spelling of the term	(1)

Question Number	Answer	Acceptable answers	Mark
5 (b)	Any two of the following <ul style="list-style-type: none"> • unicellular (1) • do not have nucleus / DNA in cytoplasm (1) • circular DNA / plasmids (1) 		(2)

Question Number	Answer	Acceptable answers	Mark
5 (c)	an explanation linking two of the following <ul style="list-style-type: none"> • there are variations within a species • some organisms have similar features / features that are common to more than one {group / species / kingdom} (1) • some closely related species can interbreed / breed with each other (1) • hybrids can be produced (1) 	allow references to specific organisms such as the duck billed platypus / axolotl / kiwi	(2)

Question Number	Indicative Content	Mark
QWC	<p>*5(d) A description including some of the following</p> <ul style="list-style-type: none"> • physical external characteristics of vertebrates such as fur/ feathers / smooth skin • vertebrates can be classed further through how they absorb oxygen • fish have gills to absorb oxygen from the water they swim in • mammals /reptiles / birds all have lungs to absorb oxygen • young amphibians have gills but adult amphibians have lungs / diffuse oxygen through moist skin • vertebrates can be classed further based on their reproductive method • external fertilisation in fish (water fertilisation usually) • internal fertilisation in mammals /birds • lay eggs in bird vertebrates / oviparous or whether they give birth to live young in mammalian vertebrates / viviparous • vertebrates can be classed further based on their thermoregulation • reptiles will use poikilothermic processes to regulate their body temperature • mammals/birds will use homeothermic processes to regulate their body temperature 	(6)
Level	0	No rewardable content
1	1 - 2	<ul style="list-style-type: none"> • a limited description of one or more method of the classification of vertebrates probably limited to physical external characteristics • 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 or more methods of classification of vertebrates of which one must be thermoregulation, fertilisation, reproduction or oxygen absorption • 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 two or more methods of the classification of vertebrates including either oxygen absorption methods, thermoregulation, fertilisation, reproductive methods with correct scientific terms included • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	substitution (1) $4.8 - 2.6$ $= 2.2$ (%) evaluation (1) $2.2 \times 600\,000$ $= 1\,320\,000$	give full marks for correct answer, no working	(2)

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	Any two of the following points <ul style="list-style-type: none"> • (increase in people who are) overweight / have a high BMI / are obese (1) • (increased number of people) who do not take enough exercise (1) • increased calorie intake (1) • increase in elderly population (1) 	(Increased number of people) who eat too much / eat the wrong types of food / eat too much fat / sugar / carbohydrates	(2)

Question Number	Answer	Acceptable answers	Mark
6(b)	An explanation including two of the following points <ul style="list-style-type: none"> • diet to lose weight (1) • reduce the amount of carbohydrates / glucose (1) • take more exercise so reduce blood glucose levels (1) 	accept sugar for glucose	(2)

Question Number		Indicative Content	Mark
QWC	*6(c)	<p>An explanation linking some of the following points</p> <p>When blood glucose is high</p> <ul style="list-style-type: none"> insulin is released from the pancreas the insulin converts the excess glucose into glycogen which is stored in the liver blood glucose levels are reduced <p>When blood glucose levels are low</p> <ul style="list-style-type: none"> glucagon is released from the pancreas the glucagon converts glycogen from the liver into glucose blood glucose levels are raised <p>This is a homeostatic mechanism which maintains the correct glucose levels in the bloodstream</p>	(6)
Level	0	No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> a limited explanation of blood glucose regulation including the role of hormones, specific hormones do not need to be 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 blood glucose regulation including the role of insulin or glucagon and some of the body organs involved 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 blood glucose regulation including the role of the liver and pancreas and the methods of reducing and raising blood glucose concentrations the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately spelling, punctuation and grammar are used with few errors 	

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