

Mark Scheme (Results)

Summer 2012

GCSE Biology
5BI1H/01

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GCSE Biology 5BI 1H/01 Mark Scheme – Summer 2012

Question Number	Answer	Acceptable answers	Mark
1a(i)	homozygous recessive	Accept in any order: homozygous recessive (alleles)	(1)

Question Number	Answer	Acceptable answers	Mark											
1(a)(ii)	<p align="center">female gametes</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td align="center">e</td> <td align="center">e</td> </tr> <tr> <td align="center">male gametes</td> <td align="center">E</td> <td align="center">Ee</td> <td align="center">Ee</td> </tr> <tr> <td></td> <td align="center">e</td> <td align="center">ee</td> <td align="center">ee</td> </tr> </table> <p>correct gametes in male/female gametes headings (1)</p> <p>correct offspring genotypes (1)</p>		e	e	male gametes	E	Ee	Ee		e	ee	ee		(2)
	e	e												
male gametes	E	Ee	Ee											
	e	ee	ee											

Question Number	Answer	Acceptable answers	Mark
1a(iii)	<p>Any one of the following</p> <ul style="list-style-type: none"> • 1/2 • 0.50 • 2/4 • 50 % • 1:1 / 2:2 	<p>Accept if 2 correct answers are given e.g. ½, 50%</p> <p>evens chance</p>	(1)

Question Number	Answer	Acceptable answers	Mark
1(a)(iv)	A 0%		(1)

Question Number	Answer	Acceptable answers	Mark
1(b)	<p>A description including the following points</p> <ul style="list-style-type: none"> • reference to mucus (1) • location described e.g. lungs / pancreas / reproductive system (1) • consequence described e.g. breathing difficulty / infection / weight loss due to blocking of enzymes / difficulty with digestion or absorption / infertility (1) 	<p>Accept three symptoms described (3) Ignore: references to symptoms of sickle cell</p> <p>Accept – airways for lungs</p> <p>Accept fertility problems for infertility</p> <p>Symptoms may include</p> <p>diabetes (1) malnutrition (1) incontinence in females (1) sinusitis (1) nasal polyps (1) arthritis (1)</p>	(3)

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	substitution (1) 2700000/100 or 27,000 evaluation (1) 27000 x 56 = 1.512 (million people) / 1.5	give full marks for correct answer, no working Accept 1,512,000 (2 marks)	(2)

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	not every person was questioned / not all people questioned would give a correct answer /be honest / people may have taken more than one type of drug / reference to date so may not be relevant		(1)

Question Number	Answer	Acceptable answers	Mark
2(b)	Any two of the following points <ul style="list-style-type: none"> • tobacco contains nicotine (1) • is addictive (1) • it acts on receptor sites in the brain to make you crave more of the same drug (1) 		(2)

Question Number	Answer	Acceptable answers	Mark
2(c)(i)	B caffeine		(1)

Question Number	Answer	Acceptable answers	Mark
2(c)(ii)	<p>An explanation linking the following points</p> <ul style="list-style-type: none"> • stimulants reduce reaction times/increase the speed of reactions / speed up reaction times (1) • by increasing neurotransmission (1) • acts at the synapse (1) 	speed up neurotransmission (2)	(2)

Question Number	Answer	Acceptable answers	Mark
3 (a) (i)	<p>A description including two of the following points</p> <ul style="list-style-type: none"> • initial /at the start increase in concentration (1) • 06.00 to 08.00 / 12.00 to 13.00 (1) • decrease in concentration after 08.00 / fall in concentration between 08.00 and 12.00 (1) • increased again at 13.00 (1) 	accept specific times eg. at 8.00 concentration high	(2)

Question Number	Answer	Acceptable answers	Mark
3(a) (ii)	<ul style="list-style-type: none"> • increase due to food intake (1) • decrease due to glucose being used up / stored /insulin released / doing exercise(1) 	<p>accept 8:00 or 13:00 for increase</p> <p>answers must be linked to idea of increase or decrease not simply eating food</p>	(2)

Question Number	Answer	Acceptable answers	Mark
3(a) (iii)	C glycogen in the liver		(1)

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	substitution (1) $1.50^2 = 2.25$ or $67.5 / 1.5^2$ (1) evaluation (1) $67.5 \div 2.25 = \text{BMI of } 30$	accept 45 (1) (as this is the correct calculation without squaring the 1.5) give full marks for correct answer, no working	(2)

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	An explanation including the following points <ul style="list-style-type: none"> • physical activity can be performed (to reduce glucose levels) (1) • diet can be controlled (to reduce glucose levels) (1) • take medication (orally or injected) (1) 	accept insulin/ metformin for medication	(3)

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

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	<p>A description of the processes that return carbon dioxide to the atmosphere including</p> <ul style="list-style-type: none"> • respiration in animals / respiration from arrow 2 (1) • respiration in plants / respiration from arrow 5 (1) • decomposition /respiration by microorganisms / decomposition /respiration arrow 3 (1) 	<p>accept trees combusting/burning releasing CO₂</p> <p>ignore - references to arrow 1 returning carbon dioxide to the atmosphere / photosynthesis / references to arrow 4</p>	(3)

Question Number	Answer	Acceptable answers	Mark
4(b)	<p>An explanation linking the first bullet point with an explanation including</p> <ul style="list-style-type: none"> • increase in carbon dioxide levels (1) <p>Plus one of the following</p> <ul style="list-style-type: none"> • respiration/ burning of fossil fuels/ waste decaying (1) • deforestation leading to reduced photosynthesis (1) 	<p>maximum 1 mark for reason accept named fossil fuel</p>	(2)

Question Number	Answer	Acceptable answers	Mark
4 (c)	lichen / blackspot fungus	other air quality indicator species eg. canaries / algae / moss / peppered moths	(1)

Question Number	Answer	Acceptable answers	Mark
4(d)	<p>An explanation linking three of the following including points</p> <ul style="list-style-type: none"> • algal bloom/ increased algae / more algae (1) • blocks sunlight (from plants growing on the bottom of the lake/river) (1) • so stops photosynthesis (1) • (plants die) so decomposers break them down • which use oxygen for respiration /oxygen depletion (1) 	<p>Ignore encourages algae to grow</p> <p>Accept bacteria/microorganisms for decomposers</p> <p>No mark for 'plants die'</p> <p>Do not give mark for just low oxygen this must be linked to microorganisms (respiring)</p>	(3)

Question Number	Answer	Acceptable answers	Mark
5(a) (i)	homeostasis / thermoregulation / osmoregulation		(1)

Question Number	Answer	Acceptable answers	Mark
5(a) (ii)	D 37 °C		(1)

Question Number	Answer	Acceptable answers	Mark
5(b)	<p>An explanation linking the following points</p> <ul style="list-style-type: none"> • (travel along) sensory neurones (1) • axons / dendrons (1) • as electrical / electric impulses (1) • across synapses (gap between two neurones) (1) • using neurotransmitters (1) • reference to spinal cord /CNS (1) • reference to myelin sheath (1) 	<p>dendrites</p> <p>accept signals for impulses</p> <p>ignore electronic</p>	(4)

Question Number	Indicative Content	Mark
QWC	<p>*5(c) An explanation of thermoregulation in response to a low external temperature</p> <ul style="list-style-type: none"> • hypothalamus detects a drop in the blood's temperature • vasoconstriction • blood vessels near the surface of the skin constrict • reduce blood flow to the skin • reduce heat loss via radiation • hair erector muscles contract • raises hairs on body to trap a layer of insulating air between cold environment and body surface • reduce heat loss via conduction • shivering will occur • skeletal muscles contract and relax involuntarily • produces respiratory heat to warm up body • hypothalamus detects a rise in the blood's temperature • reference to negative feedback 	(6)
Level	0	No rewardable content
1	1 - 2	<ul style="list-style-type: none"> • a limited explanation is provided for one of the methods of raising body temperature • 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 two of the methods of raising body temperature or one method explained in detail, alternatively a limited explanation of all three methods • 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 at least one of the methods of raising body temperature with a simple explanation of two others • most of the steps are identified and are in a logical order and reference may be made to hypothalamus and negative feedback • 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)	(direct) contact (with fungus) / touch / through the skin /surfaces		(1)

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	antifungal	fungicide / antibiotics/ <i>nystatin / terbinafine / itraconazole</i>	(1)

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

Question Number	Answer	Acceptable answers	Mark
6(b)(ii)	An explanation including 3 of the following points: <ul style="list-style-type: none"> • lysozymes / enzymes (1) • found in tears (1) • hydrochloric acid (1) • in the stomach (1) • (chemical defence) destroy bacteria / pathogens (1) 	accept lungs/saliva for tears stomach acid (1) accept viruses for pathogens Ignore references to mucus	(3)

Question Number	Indicative Content	Mark
QWC	<p data-bbox="233 282 320 315">*6(c)</p> <p data-bbox="344 282 1350 349">An explanation of how MRSA has increased since 1993 also using the evaluation of data from the graph</p> <ul data-bbox="392 394 1350 909" style="list-style-type: none"> • the number of patients suffering from MRSA has increased / more cases of MRSA • by over 366 000 since 1993 • data quoted from the graph • ref to poor hygiene in hospitals • MRSA is a bacterium that is resistant to antibiotics • individual bacteria show variation • when a bacterial infection is treated with antibiotics those bacteria with low resistance are destroyed first • the more resistant bacteria survive • if a patient stops taking the antibiotics then the resistant bacteria will live to reproduce • the new bacteria will also be resistant to antibiotics • these bacteria will not be able to be treated with antibiotics so the number of cases continue to rise 	(6)
Level	0 No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> • a limited description of the graph only or the increase in bacteria only • 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 the graph with a limited explanation of how bacteria continued to increase • 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 (with data) using the graph of the emergence of resistant bacteria which then reproduce, linked to antibiotic treatment • most of the steps are identified and are in a logical order • 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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