

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
<b>1a(i)</b>	homozygous recessive	Accept in any order:  homozygous  recessive (alleles)	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark											
<b>1(a)(ii)</b>	<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		<b>(2)</b>
	e	e												
male gametes	E	Ee	Ee											
	e	ee	ee											

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

Question Number	Answer	Acceptable answers	Mark
<b>1(a)(iv)</b>	<b>A</b> 0%		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(b)</b>	<p>A description including the following points</p> <ul style="list-style-type: none"> <li>• reference to mucus (1)</li> <li>• location described e.g. lungs / pancreas / reproductive system (1)</li> <li>• consequence described e.g. breathing difficulty / infection / weight loss due to blocking of enzymes / difficulty with digestion or absorption / infertility (1)</li> </ul>	<p><b>Accept</b> 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>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(i)</b>	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)	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(ii)</b>	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		<b>(1)</b>

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

Question Number	Answer	Acceptable answers	Mark
<b>2(c)(i)</b>	<b>B</b> caffeine		<b>(1)</b>

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

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

Question Number	Answer	Acceptable answers	Mark
<b>3(a) (ii)</b>	<ul style="list-style-type: none"> <li>• increase due to food intake (1)</li> <li>• decrease due to glucose being used up / stored /insulin released / doing exercise(1)</li> </ul>	<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>	<b>(2)</b>

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

Question Number	Answer	Acceptable answers	Mark
<b>3(b)(i)</b>	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	<b>(2)</b>

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



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"> <li>• respiration in animals / respiration from arrow 2 (1)</li> <li>• respiration in plants / respiration from arrow 5 (1)</li> <li>• decomposition /respiration by microorganisms / decomposition /respiration arrow 3 (1)</li> </ul>	<p>accept trees combusting/burning releasing CO<sub>2</sub></p> <p><b>ignore</b> - 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"> <li>• increase in carbon dioxide levels (1)</li> </ul> <p>Plus <b>one</b> of the following</p> <ul style="list-style-type: none"> <li>• respiration/ burning of <b>fossil</b> fuels/ waste decaying (1)</li> <li>• deforestation leading to reduced photosynthesis (1)</li> </ul>	<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 <b>three</b> of the following including points</p> <ul style="list-style-type: none"> <li>• algal bloom/ <b>increased</b> algae / <b>more</b> algae (1)</li> <li>• blocks sunlight (from plants growing on the bottom of the lake/river) (1)</li> <li>• so stops photosynthesis (1)</li> <li>• (plants die) so decomposers break them down</li> <li>• which use oxygen for respiration /oxygen depletion (1)</li> </ul>	<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
<b>5(a) (i)</b>	homeostasis / thermoregulation / osmoregulation		<b>(1)</b>

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

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

Question Number	Indicative Content	Mark
<b>QWC</b>	<p><b>*5(c)</b> An explanation of thermoregulation in response to a low external temperature</p> <ul style="list-style-type: none"> <li>• hypothalamus detects a drop in the blood's temperature</li> <li>• vasoconstriction</li> <li>• blood vessels near the surface of the skin constrict</li> <li>• reduce blood flow to the skin</li> <li>• reduce heat loss via radiation</li> <li>• hair erector muscles contract</li> <li>• raises hairs on body to trap a layer of insulating air between cold environment and body surface</li> <li>• reduce heat loss via conduction</li> <li>• shivering will occur</li> <li>• skeletal muscles contract and relax involuntarily</li> <li>• produces respiratory heat to warm up body</li> <li>• hypothalamus detects a rise in the blood's temperature</li> <li>• reference to negative feedback</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>• a limited explanation is provided for one of the methods of raising body temperature</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>• 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</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>• a detailed explanation of at least one of the methods of raising body temperature with a simple explanation of two others</li> <li>• most of the steps are identified and are in a logical order and reference <b>may</b> be made to hypothalamus and negative feedback</li> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>

Question Number	Answer	Acceptable answers	Mark
<b>6(a)(i)</b>	(direct) contact (with fungus) / touch / through the skin /surfaces		<b>(1)</b>

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

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

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

Question Number	Indicative Content	Mark
<b>QWC</b>	<p><b>*6(c)</b> An explanation of how MRSA has increased since 1993 also using the evaluation of data from the graph</p> <ul style="list-style-type: none"> <li>• the number of patients suffering from MRSA has increased / more cases of MRSA</li> <li>• by over 366 000 since 1993</li> <li>• data quoted from the graph</li> <li>• ref to poor hygiene in hospitals</li> <li>• MRSA is a bacterium that is resistant to antibiotics</li> <li>• individual bacteria show variation</li> <li>• when a bacterial infection is treated with antibiotics those bacteria with low resistance are destroyed first</li> <li>• the more resistant bacteria survive</li> <li>• if a patient stops taking the antibiotics then the resistant bacteria will live to reproduce</li> <li>• the new bacteria will also be resistant to antibiotics</li> <li>• these bacteria will not be able to be treated with antibiotics so the number of cases continue to rise</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>• a limited description of the graph only or the increase in bacteria only</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>• a simple description of the graph with a limited explanation of how bacteria continued to increase</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>• a detailed explanation (with data) using the graph of the emergence of resistant bacteria which then reproduce, linked to antibiotic treatment</li> <li>• most of the steps are identified and are in a logical order</li> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>



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