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Mark Scheme (Results)

Summer 2012

GCSE Biology
5BI1H/01

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GCSE Biology 5BI1H/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)	female gametes male gametes **E** Ee Ee **e** ee ee correct gametes in male/female gametes headings (1) correct offspring genotypes (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
1a(iii)	Any **one** of the following • 1/2 • 0.50 • 2/4 • 50 % • 1:1 / 2:2	Accept if 2 correct answers are given e.g. ½, 50% evens chance	**(1)**

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

Question Number	Answer	Acceptable answers	Mark
1(b)	A description including the following points • 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)	**Accept** three symptoms described (3) Ignore: references to symptoms of sickle cell Accept – airways for lungs Accept fertility problems for infertility Symptoms may include diabetes (1) malnutrition (1) incontinence in females (1) sinusitis (1) nasal polyps (1) arthritis (1)	**(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 • 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)	An explanation linking the following points • 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)	A description including two of the following points • 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)	• increase due to food intake (1) • decrease due to glucose being used up / stored /insulin released / doing exercise(1)	accept 8:00 or 13:00 for increase answers must be linked to idea of increase or decrease not simply eating food	**(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 ÷ 2.25 = 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 • 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)	A description of the processes that return carbon dioxide to the atmosphere including • 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)	accept trees combusting/burning releasing CO_2 **ignore -** references to arrow 1 returning carbon dioxide to the atmosphere / photosynthesis / references to arrow 4	**(3)**

Question Number	Answer	Acceptable answers	Mark
4(b)	An explanation linking the first bullet point with an explanation including • increase in carbon dioxide levels (1) Plus **one** of the following • respiration/ burning of **fossil** fuels/ waste decaying (1) • deforestation leading to reduced photosynthesis (1)	maximum 1 mark for reason accept named fossil fuel	**(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)	An explanation linking **three** of the following including points • 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)	Ignore encourages algae to grow Accept bacteria/microorganisms for decomposers No mark for 'plants die' Do not give mark for just low oxygen this must be linked to microorganisms (respiring)	**(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)	An explanation linking the following points • (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)	 dendrites accept signals for impulses ignore electronic	**(4)**

Question Number		Indicative Content	Mark
QWC	***5(c)**	An explanation of thermoregulation in response to a low external temperature • 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**	• 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**	• 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**	• 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/ *nystatin* / *terbinafine* / *itraconazole*	**(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: • 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	***6(c)**	An explanation of how MRSA has increased since 1993 also using the evaluation of data from the graph • 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**	• 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**	• 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**	• 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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