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Mark Scheme (Results)

Summer 2013

GCSE Biology (5BI1H)
Paper 01

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- For questions worth more than one mark, the answer column shows how partial credit can be allocated. This has been done by the inclusion of part marks eg (1).
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

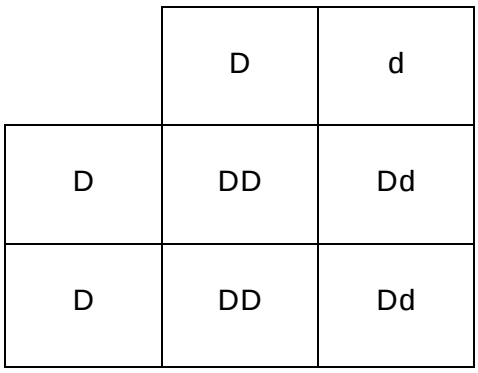
Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- Write legibly, with accurate spelling, grammar and punctuation in order to make the meaning clear
- Select and use a form and style of writing appropriate to purpose and to complex subject matter
- Organise information clearly and coherently, using specialist vocabulary when appropriate.

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	**D** ☒ homozygous recessive		(1)

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	**A description to include three of the following points:** tired / lethargic (1) short of breath / reduced oxygen carrying capacity / problems exercising (1) swelling of hands and feet (1) painful / weak joints (1) blocked blood vessels / blood clots(1)	 **Accept weak / fatigued /** Accept difficulty breathing Accept reference to pain or painful episodes/sickle cell crisis Ignore references to the shape of the red blood cell Ignore references to mucus	 (3)

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	 correct gametes (1) correct offspring genotypes (1)	 **Allow ECF for incorrect gametes**	 (2)

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	50(%) (1) 0(%) (1)	**Answers must be in this order** **Possible ecf from the candidates Punnett square** **Clip together with 1bi**	(2)

Total for Question 1 = 8 marks

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	**C** ☒ parasite		(1)

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	A suggestion linking **two of the following:** • suckers on the head /adaptation of the head (1) • attaches to the intestine (1) OR • a very long thin shape / large surface area (1) • for absorption (1) OR • surface / skin (1) • resistant to enzymes (1)	Accept hooks, teeth for suckers Reject large intestine Accept long flexible shape Ignore references to resistance to stomach acid Ignore references to larvae, eggs and reproduction	(2)

Question Number	Answer	Acceptable answers	Mark
2(a)(iii)	A suggestion including two of the following: • cooking meat thoroughly (1) • do not eat meat /become a vegetarian / vegan(1) • destroy/don't eat the cysts in the meat(1) • prevent animals from eating tapeworm eggs (1) • worm the animal (1)	Accept food/pork for meat	(2)

Question Number	Answer	Acceptable answers	Mark
2(b)	An explanation including **three** of the following: • (chemosynthetic) bacteria live in (the gut of) the tube worms (1) • the bacteria convert sulphurous / hydrogen sulphide compounds (1) • into food for the tube worms (1) • the tube worms provide place for the bacteria to live / provides oxygen for bacteria (1) • this is a mutualistic relationship (1)	**Accept sulphur** Accept bacteria make food for worms **Accept protection** Accept mutualism / mutual benefit / mutual relationship	(3)

Total for Question 2 = 8 marks

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	An explanation including **two** of the following: the dodo was multicellular (1) the dodo fed on other organisms /fed heterotrophically (1) the dodo did not have chlorophyll / cell walls (1)	 Accept animals can't make food for themselves by photosynthesis Accept chloroplasts for chlorophyll Ignore references to legs /backbone etc	(2)

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	has a (supporting) rod / spinal cord	**Accept** backbone / spine / vertebrate	(1)

Question Number	Answer	Acceptable answers	Mark
3(a)(iii)	**B** ☒ genus		(1)

Question Number	Answer	Acceptable answers	Mark
3(b)	A suggestion including 3 of the following: • Predation / disease (1) • change in environmental conditions (1) • loss of food source / reduced food source (1) • increased competition (1) • limited adaptations / survival of the fittest (1) • unable to reproduce / reproduce less (1)	 Accept named environmental change / climate change Accept food source eaten by other animals / humans Accept unable to fly so cannot escape	(3)

Question Number	Answer	Acceptable answers	Mark
3(c)	**D** ☒ speciation		(1)

Question Number	Answer	Acceptable answers	Mark
3(d)	A description to include two of the following: genetic (variation) (1) due to mutation (1) due to sexual reproduction / interbreeding / hybridisation (1) environmental (variation) (1)	 Accept references to different genes/DNA Accept named environmental change e.g.change in climate	(2)

Total for Question 3 = 10 marks

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	the later that a person gives up smoking/the longer you smoke for the higher risk of lung cancer	ORA	(1)

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	9 (%)		(1)

Question Number	Answer	Acceptable answers	Mark
4(a)(iii)	$\frac{500\,000 \times 9}{100}$ (1) = 45 000 (1)	2 marks for the correct bald answer if value other than 9 (2 – 14) inserted into correct equation ecf applies if calculation is correct	(2)

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	An explanation linking **two** of the following: • tobacco contains tar (1) • tobacco/tar contains carcinogens / causes mutations /is cancer forming (1) • nicotine in tobacco is addictive which makes it difficult to give up /causes people to smoke for longer (1)		(2)

Question Number	Answer	Acceptable answers	Mark
4b(ii)	**A** ☒ carbon monoxide		(1)

Question Number	Answer	Acceptable answers	Mark
4(c)	An explanation including **three** of the following**:** • (stimulants) act at the synapse (1) • **more** neurotransmitters (1) • so speeds up neurotransmission(1)	Accept increases neurotransmitters Accept decreases reaction time/speeds up reactions/ speeds up brain activity	(3)

Total for Question 4 = 10 marks

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	2.7	Allow -2.7 (^{o}C)	(1)

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	a comparison to include the following linked points (Rebecca's) brain temperature fluctuated / stayed similar / did not change very much (1) (whereas) finger temperature decreased (1)	Ignore references to brain temperature going up	(2)

Question Number	Answer	Acceptable answers	Mark
5(a)(iii)	an explanation to include three of the following points heat lost to the environment /from finger (1) **less** blood delivered to the skin's surface/finger (1) narrowing of the arterioles near the skin's surface (1) vasoconstriction (1) **less** heat loss by radiation(1)	accept ref to temperature gradient accept more blood flow to vital organs accept blood vessels for arterioles	(3)

Question Number		Indicative Content	Mark
QWC	***5(b)**	A explanation to include some of the following • homeostasis / regulation of the body's internal environment • controlled by the hypothalamus / thermoregulatory • hypothalamus / thermoregulatory centre monitors blood temperature • negative feedback mechanism • sweat rate increases • sweat glands will release sweat on to skin surface • evaporation of this sweat / water will remove heat energy from skin • hairs on skin's surface lay flat • no trapping of insulating air layer so body loses heat • vasodilation occurs • widening of the arterioles / blood vessels eq, near the skin delivers warm blood to skin surface • body loses heat by radiation	(6)
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited explanation of at least one method of thermoregulation • 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 including at least two methods of thermoregulation • 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 3 methods of thermo regulation. Use of the term vasodilation or including information on the process of homeostasis • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total for Question 5 = 12 marks

Question Number	Answer	Acceptable answers	Mark
6a(i)	**A** ☒ living indicators		(1)

Question Number	Answer	Acceptable answers	Mark
6a(ii)	An explanation linking the correct species with the reason: • species 2 (1) reason • coal powered power stations produce sulfur dioxide gas (1) • species 2 is tolerant of sulfur (1)	Accept sulphur for sulphur dioxide Note mark points are independent 1 mark can be attained for candidate stating that sulphur dioxide gas is produced by coal powered power stations	(2)

Question Number	Answer	Acceptable answers	Mark
6(b)	An explanation linking three of the following: • plants use /nitrogen taken in as nitrates (1) • fertilisers / compost (1) • nitrogen fixation / nitrogen fixing bacteria / lightning (1) • nitrification /nitrifying bacteria (1) • absorption through the roots (1) • by active transport (1)	Accept nitrates in the correct context	(3)

Question Number		Indicative Content	Mark
QWC	***6(c)**	A explanation to include some of the following Air pollution • Humans burn more fossil fuels coal/oil/gas • nitrogen oxides in car exhausts • Releasing sulfur dioxide • Which causes acid rain • carbon dioxide gas • causes climate change • deforestation causing increase in carbon dioxide • increased population – increased respiration more carbon dioxide Water pollution • Humans produce sewage • Sewage contains phosphates • Phosphates are water pollutants • Nitrate pollution can be caused by the overuse of fertilisers • Nitrate pollution causes eutrophication	(6)
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited explanation of how humans effect pollution – increasing pollution in either air or water • 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 both air and water pollution including the effects of one air and one water pollutant or a detailed explanation of either air or water pollution • 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 the effect of humans on both air and water pollution including the role of sulphur dioxide or carbon dioxide and nitrates or phosphates • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total for question 6 = 12 marks

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