Pearson

Mark Scheme (Results)

January 2018

Pearson Edexcel GCSE
In Biology (5BI1H)
Paper 01

edexcel

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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.
- 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.

Question number	Answer	Acceptable answers	Marks
1 (a) (i)	A description to include the following: • below 100% nitrate concentration less growth / above 100% nitrate concentration less growth (1) • optimum is 100% / max height of 176mm / 100% is the maximum height (1)		(2)

Question number	Answer	Acceptable answers	Marks
1 (a) (ii)	**D** ☒ protein		(1)

Question number	Answer	Acceptable answers	Marks
1 (a) (iii)	A description to include two of the following: • published in scientific journals (1) • the results can be peer reviewed (1) • discussed at scientific conferences (1)	Accept other scientists do the experiment Accept talk to other scientists Accept repeat the experiment (1)	(2)

Question number	Answer	Acceptable answers	Marks
1 (b)	A description to include the following: • taken up by plants for growth (1) • denitrification / denitrifying bacteria (1) • convert nitrates to nitrogen gas (1) • in anaerobic / anoxic / low oxygenated areas (1)	Accept in waterlogged areas	(3)

Total for Question 1 = 8 marks

Question number	Answer	Acceptable answers	Marks
2 (a) (i)	**B** ☒ genus of the robin		(1)

Question number	Answer	Acceptable answers	Marks
2 (a) (ii)	Chordata / chordates	accept any reasonable phonetic spelling	(1)

Question number	Answer	Acceptable answers	Marks
2 (a) (iii)	**B** ☒ heterotrophically		(1)

Question number	Answer	Acceptable answers	Marks
2 (b) (i)	An explanation including the following: • the robins will have access to food / nesting sites / territory / protection from predators (1) • so the young live long enough to reproduce (1)	Accept allow successful competition	(2)

Question number	Answer	Acceptable answers	Marks
2 (b) (ii)	Substitution 80 x 250 = 20 000 (1) 20 000 X 2 = 40 000 OR 2 x 250 = 500 (1) 500 x 80 = 40 000	2 marks awarded for correct answer with no working	(2)

Question number	Answer	Acceptable answers	Marks
2 (b) (iii)	availability of food / nesting sites / lack of predators		(1)

Total mark for question 2 = 8 marks

Question number	Answer	Acceptable answers	Marks
3 (a) (i)	An explanation to include the following: • Rob and Jane / Paula and Keith / two parents without cystic fibrosis had a child with cystic fibrosis (1) • parents must be heterozygous / carriers / pass on one recessive allele each (1)	 accept to have CF a person must have 2 recessive alleles	(2)

Question number	Answer	Acceptable answers	Marks
3 (a) (ii)	**D** ☒ ff		(1)

Question number	Answer	Acceptable answers	Marks
3 (a) (iii)	<table><tr><td></td><td>F</td><td>f</td></tr><tr><td>F</td><td>FF</td><td>Ff</td></tr><tr><td>f</td><td>Ff</td><td>ff</td></tr></table> 1 mark for correct gametes 1 mark for correct offspring genotypes 1 mark for correct probability of 50%	Accept incorrect gametes with correct offspring (1) Accept correct probability calculated from Punnett square (1)	(3)

Question number	Answer	Acceptable answers	Marks
3 (a) (iv)	**B** ☒ heterozygous		(1)

Question number	Answer	Acceptable answers	Marks
3 (b)	A description to include three of the following: • build-up of thick / of sticky mucus / extra mucus (1) • lung infections (1) • breathing difficulties (1) • weight loss / malnutrition (1) • infertility (1)	accept: blocked pancreatic duct accept: blocked reproductive tubes	(3)

Total for Question 3 = 10 marks

Question number	Answer	Acceptable answers	Marks
4 (a) (i)	**D** ☒ stimulant		(1)

Question number	Answer	Acceptable answers	Marks
4 (a) (ii)	A description linking the following: • increases the number of receptors for nicotine in the brain (1) • causing addiction (1) OR • speeds up neurotransmission (1) • at the synapse (1)		(2)

Question number	Answer	Acceptable answers	Marks
4 (b) (i)	A description linking **two** of the following: • Only 4.4% have used vaping to give up smoking (so this is not an indication that it is as a tool to give up smoking) (1) • 11.8 % are vaping and also smoking tobacco (so this is not an indication that it is as a tool to give up smoking) (1) • 0.2% of people vaping have never smoked (so this is not an indication that it is as a tool to give up smoking) (1)	Accept +/- 0.2% on graph interpretation	(2)

Question number	Answer	Acceptable answers	Marks
4 (b) (ii)	An explanation linking two of the following: • tobacco smoke contained tar (1) • which is cancer forming / a carcinogen (1)	Accept other harmful effects of tobacco smoke	(2)

Question number	Answer	Acceptable answers	Marks
4 (b) (iii)	An explanation including the following points: • carbon monoxide binds to the haemoglobin / red blood cells (1) • reducing the amount of oxygen that can be carried around the body (1) • oxygen is needed for muscle action to exercise (1)	Accept oxygen is needed for (cellular) respiration (1)	(3)

Total marks for question 4 = 10 marks

Question number	Answer	Acceptable answers	Marks
5 (a) (i)	An explanation linking the following points: • the insulin cannot reduce blood glucose levels / blood glucose levels are high (1) • because the body cells become resistant to insulin (1)		(2)

Question number	Answer	Acceptable answers	Marks
5 (a) (ii)	A description linking the following points: • reduce carbohydrate / sugar intake / low sugar / carbohydrate diet (1) • increase in exercise (to lower blood glucose) (1)	ignore healthy diet	(2)

Question number	Answer	Acceptable answers	Marks
5 (b) (i)	A comparison including: • the person with a BMI greater than 30 has the same pattern of insulin levels as the person with a BMI less than 20 (1) • the levels of insulin use are much higher in the person with a BMI greater than 30 than the person with a BMI of less than 20 (1)	Accept fluctuate in the same way	(2)

Question Number		Indicative Content	Mark
QWC	***5(b)(ii)**	An explanation to include some of the following points: When blood glucose levels are low • at 08:00, 12:00, 17:00, 01:00 • glucagon is released • from the pancreas • causing stored glycogen • from the muscles and liver • to be converted to glucose • to raise the blood glucose levels When blood glucose levels are high • at 10:00, 13:00 and 19:00 • insulin is released • from the pancreas • causing glucose to be stored as glycogen • in the liver and muscles • reducing blood glucose levels	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited explanation of one method of blood glucose regulation or correct data quoted from the graph • 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 methods of blood glucose regulation OR a detailed explanation of one method • 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 both methods of blood glucose regulation including the role of glucagon and glycogen in the process • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Total mark for question 5 = 12 marks

Question number	Answer	Acceptable answers	Marks
6 (a) (i)	39 (°C) and 25 (°C) (1) 14 (°C)		(2)

Question number	Answer	Acceptable answers	Marks
6 (a) (ii)	An explanation to include the following: • (fish is) poikilothermic (1) • body temperature is the same as the external temperature (1)	Accept ectothermic Accept as external temperature increases, body temperature increases	(2)

Question number	Answer	Acceptable answers	Marks
6 (a) (iii)	An explanation to include the following: • enzymes (that control metabolic reactions) (1) • **denature** (1)	oxygen levels would be too low (1) respiration would stop (1)	(2)

Question Number		Indicative Content	Mark
QWC	***b**	A explanation to include some of the following points • negative feedback mechanism • hypothalamus detects changes in blood temperature / receives neural stimulation from skin receptors • shivering • rhythmic involuntary contraction of muscles • respiratory heat warms body • erector muscles contract • hairs attached to erector muscles rise • trap a layer of insulating air • stops the loss of heat energy from skin • vasoconstriction • blood vessel or arterioles close to surface of skin / diameter narrows • stops the loss of heat energy from skin as blood redirected away from skin	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• A limited explanation of 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 of 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 three methods of thermoregulation • 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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