



Mark Scheme (Results)

January 2018

Pearson Edexcel GCSE
In Biology (5BI2H)
Paper 01

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Publications Code 5BI2H_01_1801_MS

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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)	Hippopotamus, Odontocetes, Mysticetes (1) All three required in any order for one mark	Accept phonetic spellings	(1)

Question number	Answer	Acceptable answers	Marks
1 (a) (ii)	5.5 million (1)	Accept any figure between 4.5 to 7 million years.	(1)

Question number	Answer	Acceptable answers	Marks
1 (a) (iii)	A suggestion to include two of the following: • thinner skull (in <i>Dorudon</i>)(1) • so more streamlined (1) OR • thinner / more streamlined (in <i>Dorudon</i>)(1) • so catch more fish / can swim faster / use less energy to {swim / catch fish} / outcompete <i>Rhodhocetus</i> (1) OR • more pointed/thinner teeth (in <i>Dorudon</i>) (1) • so grip fish / prey better (1)	Accept reverse arguments for <i>Rhodhocetus</i> accept less water resistance ignore references to 'body' features	(2)

Question number	Answer	Acceptable answers	Marks
1 (b) (i)	An explanation linking the two following points: - increase in the number of the (beneficial) bacteria (in flask two) (1) - because the beneficial bacteria can use the <u>oligosaccharides</u> / the prebiotics contain / are oligosaccharides / they can digest the prebiotics (1)	Ignore refs to any numbers quoted or to non-beneficial bacteria.	(2)

Question number	Answer	Acceptable answers	Marks
1 (b) (ii)	An explanation including (the non-beneficial bacteria were) out-competed by beneficial bacteria (1) - the beneficial bacteria used up more of the available food source / space (1)		(2)

Question 1 total= 8 marks

Question number	Answer	Acceptable answers	Marks
2 (a)	B phloem		(1)

Question number	Answer	Acceptable answers	Marks
2 (b)	An explanation linking two of the following: • photosynthesis occurs (1) • when chlorophyll / chloroplasts absorb light (1) • causing a reaction between carbon dioxide and water (1)	accept using light accept equation accept glucose is converted to sucrose / starch is digested into glucose. (1)	(2)

Question number	Answer	Acceptable answers	Marks
2 (c) (i)	D a tape measure and a quadrat		(1)

Question number	Answer	Acceptable answers	Marks
2 (c) (ii)	• all points plotted correctly within $\frac{1}{2}$ square (1) • line drawn with dot to dot and labelled species Y (1)		(2)

Question number	Answer	Acceptable answers	Marks
2 (c) (iii)	A suggestion including the following: • (more species X than species Y near the wall because) X can grow in lower light intensity (1) • at distances at 3m and more, there are fewer of species X because Y out competes X (1)	accept in lower temperatures for lower light intensity accept at 3 m there are more Y than X as Y uses up all the named factor / nutrient e.g. water.	(2)

Question 2 total = 8 marks

Question number	Answer	Acceptable answers	Marks
3 (a) (i)	Any two from the following: - the increase in mass is the same / 3.8kg (1) - however, child S is a lower mass at 6 months because of a lower birth mass (1) - percentage increase for child S is greater (1)	accept their growth rate is the same accept weight for mass	(2)

Question number	Answer	Acceptable answers	Marks
3 (a) (ii)	$2.3 \div 6.5$ (1) $= 0.354846 \times 100 = 35.3846$ / 35.4% OR $8.8 \div 6.5 = 1.35846$ (1) $\times 100 = 135.3846$ $-100 = 35.3846$ / 35.4%	Award full marks for correct bald answer accept 35% or 35.38%	(2)

Question number	Answer	Acceptable answers	Marks
3 (a) (iii)	difference in gender/diet/illness /genes / (1)	accept R has faster metabolism / is more active accept born at different masses (1)	(1)

Question number	Answer	Acceptable answers	Marks
3 (b) (i)	C ☒ stomach, pancreas and small intestine		(1)

Question number	Answer	Acceptable answers	Marks
3 (b) (ii)	An explanation linking two of the following: • to make them into amino acids (1) • which are smaller (1) • which are soluble (1) • so that they can be absorbed (1)		(2)

Question number	MT	Answer	Acceptable answers	Marks
3 (c) W	exp	An explanation including two from the following: • food enters from the stomach which has a low pH/is acidic (1) • pH increases as bile is released from the gall bladder/bile is alkaline (1)	accept pancreas secretes sodium bicarbonate / alkali (1) accept so that enzymes (in the Small intestine) are at the correct pH	2

Question 3 total = 10 marks

Question number	Answer	Acceptable answers	Marks
4 (a)	D carbon dioxide and water		(1)

Question number	Answer	Acceptable answers	Marks
4 (b)(i)	$15.6 \div 0.13$ (1) 120	award both marks for correct bald answer	(2)

Question number	Answer	Acceptable answers	Marks
4 (b)(ii)	An explanation linking three of the following • faster blood flow / more blood flows per beat / more blood flows per minute (to muscles) (1) • more {oxygen / glucose} {absorbed / supplied} (to muscles) (1) • for aerobic respiration (1) • so more energy released / more energy is being used (1)	accept more blood flows (to muscles) accept to avoid anaerobic respiration / build-up of lactic acid	(3)

Question number	Answer	Acceptable answers	Marks
4 (c)	An description including the following - carried in red blood cells (1) - attached to haemoglobin / as oxyhaemoglobin (1)	Ignore in the blood accept pumped by heart in the blood / through arteries in the blood	(2)

Question number	Answer	Acceptable answers	Marks
4 (d)	An explanation linking two of the following: - blood from the left ventricle moves into the right ventricle (1) - oxygenated / deoxygenated blood mixes (1) - blood in the left side is lower pressure / blood leaving the right side is higher pressure (1)	accept blood can go through the hole in the heart	(2)

Question 4 total = 10 marks

Question number	Answer	Acceptable answers	Marks
5 (a) (i)	C ☒ platelets		(1)

Question number	Answer	Acceptable answers	Marks
5 (a) (ii)	Two differences from the following: • adult stem cells are unspecialised / can differentiate/unipotent (1) • adult stem cells have no limit to the number of times they can divide (1)		(2)

Question number	Answer	Acceptable answers	Marks
5 (b)	Any one advantage and any one disadvantage Advantages • can differentiate into any body cell type/totipotent • can be used to generate any body tissue • wider range of treatments possible than with adult stem cells • similar to cancer cells so could be used to find cures/treatments for cancer • (if you have an embryo) it is easier to extract the stem cells Disadvantages • destroys embryos / a potential life • difficult to obtain embryonic stem cells due to legislation • lack of understanding and could turn cancerous • can be rejected		(2)

Question Number		Indicative Content	Mark
QWC	*5c	A description which includes some of the following points • remove a body cell of a red panda • remove the diploid nucleus • remove an egg cell from a female red panda • enucleate the egg cell • insert the diploid nucleus into the enucleated egg cell • stimulate this cell to divide • using electric shock/chemicals • cell divides by mitosis • embryo is implanted into uterus • of surrogate female panda • repeat to increase population of red pandas	(6)
Level	0	No rewardable content	
1	1 - 2	• A limited description that includes at least one stages of cloning • 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 that includes at least two stages of cloning in a logical sequence • 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 description that would result in a cloned red panda including two of:- stimulating division / with chemicals or an electric shock and implanting into uterus /of a surrogate mother. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Question 5 total = 11 marks

Question number	Answer	Acceptable answers	Marks
6 (a)	A description including 3 of the following • DNA splits (along short length) / hydrogen bonds broken (between DNA strands) (1) • complementary bases pair up free bases / nucleotides match up to DNA(1) • U replaces T (in copied strand) (1) • to make mRNA (1)	Accept DNA unzips Ignore DNA acts as a template T to A and C to G accept reference to enzymes either splitting DNA or joining bases (1) accept occurs in the nucleus / then leaves the nucleus (1)	(3)

Question number	Answer	Acceptable answers	Marks
6 (b) (i)	D ☒ neither statement 1 nor 2		(1)

Question number	Answer	Acceptable answers	Marks
6 (b) (ii)	A explanation including two of the following: • base / triplet / codon changed (1) • mRNA / codon matches up with different tRNA / anticodon (1) • different amino acid (added to polypeptide / protein) (1) • protein is a different shape (so has different properties) (1)	accept enzyme / active site for protein	(3)

Question Number		Indicative Content	Mark
QWC	*6c	A comparison between some of the following: Mitosis • two cells produced • diploid cells • chromosomes in pairs/2n/23 pairs • one cell division • cells produced are genetically identical • cells produced are body/somatic cells / for growth and repair • occurs in all parts of the body / named part of body. Meiosis • 4 cells produced • haploid cells • single set of chromosomes/n/23 • two cell divisions • cells produced are genetically different • cells produced are gametes / for sexual reproduction • occurs in testes/ovaries credit any similarity eg both mitosis and meiosis involve DNA being copied / chromosomes are pulled to the poles. Similarities may be expressed if the details of the process of mitosis and meiosis are described.	(6)
Level	0	No rewardable content	
1	1 - 2	• A limited description of either stating one similarity or one difference. • 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 comparing at least two similarities or two differences or one of each. • 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 description comparing at least three similarities and differences. • the answer communicates ideas clearly two and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

Question 6 total = 13 marks

