

Mark Scheme (Results)

November 2012

GCSE Biology
5BI2H/01

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GCSE Biology 5BI2H/01 Mark Scheme – November 2012

Question Number	Answer	Acceptable answers	Mark
1(a)	A – chromosomal DNA		(1)

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	Any two from the following <ul style="list-style-type: none"> • cell wall (1) • capsule / slime coat (1) • small ribosome (1) • pilli (1) • mesosome (1) 	not membrane ignore flagellum / vacuole / DNA	(2)

Question Number	Answer	Acceptable answers	Mark
1(b)(ii)	A description including any three from the following <ul style="list-style-type: none"> • removal of (human) gene (1) • plasmid is cut / removed from bacteria (1) • using enzymes (1) • gene / DNA (from human cell) added to plasmid (1) • plasmid inserted into bacterium (1) 	ignore ref to DNA being removed from plasmid	(3)

Question Number	Answer	Acceptable answers	Mark
1 (b) (iii)	<p>Any two from the following</p> <ul style="list-style-type: none"> • to produce medicines/vaccines / hormones /insulin / clotting factors (1) • an appropriate advantage (1) 	<p>ignore details of modification</p> <p>e.g. cure diseases, for diabetes, less likely to be rejected, avoids use of animals, produces large quantities, can be used by vegans</p> <p>Allow an appropriate advantage of golden rice</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(a)	A description that includes two of the following <ul style="list-style-type: none"> hydrogen bonds (1) between (complementary) base pairs (1) 	H bonds accept singular A and T, G and C but not the wrong pairings	(2)

Question Number	Answer	Acceptable answers	Mark
2(b)	<ul style="list-style-type: none"> one bar the height of the guanine bar (34%) and one bar the height of the thymine bar (16%) (1) bars for cytosine and adenine shown the correct way round (1) 	+/- 1 square (including sketches)	(2)

Question Number	Answer	Mark																		
2(c)(i)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>G</td><td>G</td><td>C</td><td>T</td><td>A</td><td>G</td><td>T</td><td>T</td><td>G</td> </tr> </table> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>C</td><td>C</td><td>G</td><td>A</td><td>U</td><td>C</td><td>A</td><td>A</td><td>C</td> </tr> </table> <p>[all correct = 2 marks and 1 mistake = 1 mark]</p>	G	G	C	T	A	G	T	T	G	C	C	G	A	U	C	A	A	C	(2)
G	G	C	T	A	G	T	T	G												
C	C	G	A	U	C	A	A	C												

Question Number	Answer	Acceptable answers	Mark
2(c)(ii)	three / 3	Reject any other numbers given	(1)

Question Number	Answer	Acceptable answers	Mark
2(d)	ribosome(s) / polysome(s)	Ignore cytoplasm Reject any other structure given	(1)

Question Number	Answer	Acceptable answers	Mark
3(a)	D - transpiration		(1)

Question Number	Answer	Acceptable answers	Mark
3(b)(i)	B – 32 g		(1)

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	<p>A description including two of the following</p> <ul style="list-style-type: none"> • it rises between the temperatures of 15(°C) and 35(°C) (1) • water loss decreases after 35(°C) (1) • credit correct reference to figures from the table, if related to temperature (1) 	<p>ignore any explanation given, including ref to transpiration</p> <p>award one mark for : water loss went up and then went down</p> <p>eg. greatest water loss at 35(°C) there is less water loss at 45(°C) than at 35(°C)</p>	(2)

Question Number	Answer	Acceptable answers	Mark
3(b)(iii)	<p>A suggestion including any two from the following:</p> <ul style="list-style-type: none"> • prevent evaporation/loss of water from the soil (1) • to ensure that mass of the calcium chloride only changed (due to water loss from plant) (1) • to ensure that method is valid / it is a fair test (1) • to stop the uptake of water by the soil (1) 	<p>ignore ref to water loss from pot or roots</p> <p>ignore accurate and reliable</p>	(2)

Question Number	Answer	Acceptable answers	Mark
3(c)	<p>An explanation including any two from the following:</p> <ul style="list-style-type: none"> • glucose production will decrease (1) • photosynthesis will decrease (with increase in waterloss)(1) • as water is used in photosynthesis (1) 	<p>glucose production stops</p> <p>photosynthesis will stop / is less efficient</p> <p>accept from a correct equation</p>	(2)
Question Number	Answer	Acceptable answers	Mark
3(d)	<p>A description including two from the following:</p> <ul style="list-style-type: none"> • osmosis (1) • from high concentration to low concentration / down a concentration gradient (1) • through a partially permeable membrane (1) 	<p>not active transport, but ignore diffusion</p> <p>correct references to water potential and solute potential</p> <p>not from where there are more water molecules</p> <p>semi permeable and selectively permeable</p>	(2)

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	D - pancreas		(1)

Question Number	Answer	Acceptable answers	Mark
4(a)(ii)	B – fatty acids and glycerol		(1)

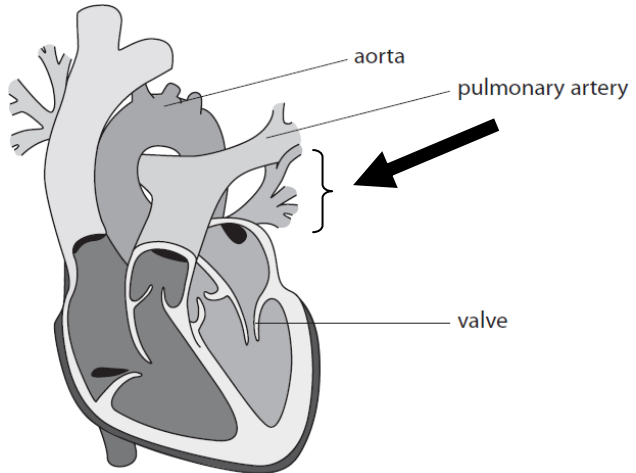
Question Number	Answer	Acceptable answers	Mark
4(b)(i)	protease / pepsin	Reject any other enzyme given	(1)

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	amino acid / amino acids		(1)

Question Number	Answer	Acceptable answers	Mark
4(b)(iii)	<ul style="list-style-type: none"> • correct values read from graph (= 12 and 9) (1) • 3 arbitrary units (1) 	award 2 marks for correct answer with no working ecf ignore + and - signs	(2)

Question Number	Answer	Acceptable answers	Mark
4(b)(iv)	<p>Any two of the following points</p> <ul style="list-style-type: none"> • at pH 2 the active site is distorted / enzyme changes shape / enzyme is denatured (1) • so less successful collisions / less enzyme substrate complexes / enzyme cannot bind to substrate (1) • optimum pH is 1.4 (1) • pH 1 is closer to the enzyme's optimum pH (1) 	ignore any names of enzymes	(2)

Question Number	Answer	Acceptable answers	Mark
4(c)	An explanation including the following points <ul style="list-style-type: none"><li data-bbox="406 409 836 481">• neutralisation of stomach acid<li data-bbox="406 517 767 551">• emulsification of fats	makes intestine more alkaline breaks down fats but not into fatty acids and glycerol	(2)

Question Number	Answer	Acceptable answers	Mark
5(a)(i)	 <p>The diagram shows a cross-section of the heart. Labels include 'aorta' at the top, 'pulmonary artery' on the right, and 'valve' at the bottom. A black arrow points to the opening of the pulmonary vein entering the heart, which is indicated by a bracket.</p>	<p>ignore any labels on the arrow</p> <p>allow an arrow coming out of the opening of pulmonary vein into heart</p>	(1)

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	<p>Any two from the following:</p> <ul style="list-style-type: none"> (blood in pulmonary artery) deoxygenated (1) (blood in pulmonary artery) lower pressure (1) 	<p>accept reverse argument for aorta</p> <p>carrying less oxygen / no oxygen</p> <p>less force / slower</p>	(2)

Question Number	Answer	Acceptable answers	Mark
5(a)(iii)	<p>Any two from the following:</p> <ul style="list-style-type: none"> prevent backflow (1) (from ventricle) into atrium (1) 	<p>description of backflow</p> <p>ignore references to left atrium and deoxygenated blood</p>	(2)

Question Number	Answer	Acceptable answers	Mark
5(b)(i)	D – ventricle every minute		(1)

Question Number		Indicative Content	Mark
QWC	*5(b)(ii)	<p>A description including</p> <ul style="list-style-type: none"> • there will less blood flow (to the muscles) • because less blood leaving the heart • less oxygen (reaching muscle) • less glucose (reaching muscle) • reduced rate of aerobic respiration • less energy released • less carbon dioxide removed • greater rate of anaerobic respiration • glucose broken down without oxygen • reduced muscle contraction • build up of lactic acid (in muscle cells) • causing cramp / fatigue 	(6)
Level I	0	No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> • a limited description of 2 effects of reduced cardiac output on muscle • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy 	
2	3 - 4	<ul style="list-style-type: none"> • a simple description of 4 or more effects of reduced cardiac output on muscle, but some steps maybe missing or out of 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	<ul style="list-style-type: none"> • a detailed description of 6 or more effects of a reduced cardiac output on muscle, with the sequence largely in order and complete • 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)	<p>A description including four of the following points</p> <ul style="list-style-type: none"> • ref to meiosis (1) • 4 cells produced (from one parent cell) (1) • haploid (cells) / cells have half the number of chromosomes (1) • cells are genetically different (1) 	<p>do not accept if there is a 't'</p> <p>cells have one set of chromosomes / 23 chromosomes</p>	(4)

Question Number		Indicative Content	Mark
QWC	*6(b)	<p>A description including</p> <ul style="list-style-type: none"> • fertilisation of egg by sperm • ref to fusion of nuclei • forming diploid cell • ref to zygote • (zygote) divides by mitosis • to form identical cells • several mitotic divisions • growth of foetus • examples of how fetus grows eg in height, mass • stem cells in embryo • specialisation / differentiation of (stem) cells into different cell types • examples of different cell types eg neurones, skin cells • development of fetus 	(6)
Level	0	No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> • a limited description including 2 or more comments about one process • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy 	
2	3 - 4	<ul style="list-style-type: none"> • a simple description including 2 or more comments on 2 processes • 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	<ul style="list-style-type: none"> • a detailed description including 2 or more comments on all 3 processes • 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(c)	<p>Any two from the following:</p> <ul style="list-style-type: none"> • sexual reproduction involves two parents but asexual reproduction only involves one (organism / parent / cell) (1) • sexual reproduction needs gametes / sex cells but asexual reproduction does not (1) • sexual reproduction produces genetically different organisms but asexual reproduction produces genetically identical offspring / clones (1) 	<p>ignore any reference to meiosis or mitosis</p> <p>sexual reproduction results in variation but asexual reproduction does not</p>	(2)

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