

Mark Scheme (Results)

March 2013

GCSE Biology
5BI2H/01

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Question Number	Answer	Acceptable answers	Mark
1(a)(i)	B		(1)

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	Any two from the following: <ul style="list-style-type: none"> • diffusion (1) • from an area of high concentration to an area of low concentration/down a concentration gradient (1) • through stoma / stomata (1) 	Accept pores / between guard cells Ignore through guard cells	(2)

Question Number	Answer	Acceptable answers	Mark
1(a)(iii)	Any three from the following: <ul style="list-style-type: none"> • (by) photosynthesis (1) • ref to chloroplast / chlorophyll (1) • requires carbon dioxide and water (1) • light (energy) needed (for photosynthesis)(1) • (to produce) glucose (1) 	Ignore incorrect balancing of equations throughout Reject (and) respiration Accept if written on arrow in word / formula equation Accept correct formulae word / formula equation Accept if written on arrow in word / formula equation Reject energy is created / produced Accept sugar from word / formula equation	(3)

Question Number	Answer	Acceptable answers	Mark
1(b)	water _____ osmosis (1)	3 lines, 1 correct = 0 mark 3 lines, 2 correct = 1 mark 4 lines, 1 correct = 0 mark 4 lines, 2 correct = 0 mark	

	mineral ions active transport (1)		(2)
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Question Number	Answer	Acceptable answers	Mark
2(a)(i)	<ul style="list-style-type: none"> height / growth increases until 15/18 (years old) (1) height / growth starts to level off / plateau / slows down after 15/18 (1) 	Accept increases and then levels off / height increases (until 20) for 1 mark ecf on figures quoted Accept growth stops after 18	(2)

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	<ul style="list-style-type: none"> 155 / 155.5 – 132 / 132.5 (cm) (1) answer between 22 and 23.5 (cm) (1) 	Two marks for correct bald answer ecf 2 marks cannot be awarded if mp 1 not correct	(2)

Question Number	Answer	Acceptable answers	Mark
2(a)(iii)	An explanation linking two points <ul style="list-style-type: none"> 95% will be smaller / that height or smaller OR <ul style="list-style-type: none"> 5% will be taller / at that height or taller (1) at that age (1) 		(2)

Question Number	Answer	Acceptable answers	Mark
2(b)(i)	transcription (1)	Accept phonetic spelling	(1)

Question Number	Answer	Acceptable answers	Mark
2(b)(ii)	A		(1)

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	<ul style="list-style-type: none"> • (heart rate =)198 to 200 (1) • (0.18 x 198 to 200 =) 35.6 to 36 (1) 	2 marks for correct bald answer ecf	(2)

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	B - 12.8 mmol dm ⁻³		(1)

Question Number	Answer	Acceptable answers	Mark
3(a)(iii)	D - the concentration of lactic acid is not dependent on heart rate		(1)

Question Number	Answer	Acceptable answers	Mark
3(a)(iv)	<p>Any three from the following:</p> <ul style="list-style-type: none"> • lactic acid increases / more lactic acid produced (as exercise increases) (1) • using more energy /muscles working / contracting harder / faster (1) • <u>aerobic</u> respiration at its maximum (rate) (1) • as oxygen not supplied fast enough / muscles not getting enough oxygen (1) • <u>anaerobic</u> respiration occurs (producing lactic acid) (1) 	<p>Accept stops Ignore breathing</p> <p>Accept body Accept not enough oxygen /oxygenated blood</p>	(3)

Question Number	Answer	Acceptable answers	Mark
3(b)	Any three from the following: <ul style="list-style-type: none"> • (concentration of lactic acid) decreases (1) • lactic acid broken down(1) • using oxygen / oxidised(1) • into carbon dioxide and water (1) • ref to oxygen debt / EPOC (1) 	Accept amount Accept if written in a word or formula equation for MP3 and MP4	(3)

Question Number	Answer	Acceptable answers	Mark
4(a)	<p>A suggestion including any three linked points</p> <ul style="list-style-type: none"> • ref to use of enzymes (1) • isolate / remove /cut out gene / DNA (for resistance)(1) • (coding for) enzyme (1) • from bacteria (1) • insertion of gene / DNA into crops / plants (1) 	<p>Any named enzyme must be in correct context.</p> <p>Ignore plasmids</p> <p>Reject replace</p>	(3)

Question Number	Answer	Acceptable answers	Mark
4(b)	<ul style="list-style-type: none"> • in the phloem (1) 	<p>Accept phonetic spelling e.g. phloem /flowem</p>	(1)

Question Number	Answer	Acceptable answers	Mark
4(c)(i)	<p>A description including two of the following points</p> <ul style="list-style-type: none"> • 0 to 10/11 no effect / change / difference (1) • 10/11 to 28 / 29/30 decrease in mass / yield (1) • Over 28 / 29/30 no change (1) 	<p>Accept decreases for 1 mark (if no other marks awarded)</p> <p>ecf throughout</p>	(2)

Question Number	Answer	Acceptable answers	Mark
4(c)(ii)	B - 30 arbitrary units		(1)

Question Number	Answer	Acceptable answers	Mark
4(d)(i)	<ul style="list-style-type: none"> number of species increase / go up (1) 	Ignore number of weeds	(1)

Question Number	Answers	Acceptable answers	Mark
4(d)(ii)	<p>Suggestions including two of the following linked points</p> <ul style="list-style-type: none"> increased use of herbicide-resistant crops (1) increased use (concentration / time) of herbicide (1) ref to transfer of genes into weeds from other plants / cross pollination (1) mutation(1) 	<p>Ignore ref to evolution / natural selection</p> <p>Ignore immune (to herbicide)</p> <p>Accept a description eg continued use of herbicide</p> <p>Accept cross breeding / reproduction / contamination</p>	(2)

Question Number	Answer	Acceptable answers	Mark
5(a)	C peristalsis		(1)

Question Number	Answer	Acceptable answers	Mark
5(b)	<ul style="list-style-type: none"> • neutralisation (of stomach acid) / raise pH (1) • emulsification / break down of fats (1) 	<p>Accept makes stomach / intestine contents more alkaline</p> <p>Accept breaks down large droplets / globules / increases surface area of fats</p> <p>Reject molecules broken down</p>	(2)

Question Number		Indicative Content	Mark
QWC	*5(c)	<p>A description including some of the following points in a logical sequence</p> <p>Names of enzymes:</p> <ul style="list-style-type: none"> • carbohydrases • named carbohydrase eg amylase • proteases • named protease eg pepsin • lipases • named lipase <p>General points about enzyme action:</p> <ul style="list-style-type: none"> • breakdown of large / insoluble / named molecules into small / soluble / named molecules • for absorption • catalysts • speeds up reactions • active sites that bind to substrate • idea of specificity <p>Specific points:</p> <ul style="list-style-type: none"> • carbohydrates/ starch are broken down • into sugars / glucose • proteins /named protein are broken down • into amino acids • fats / oils / lipids / named lipid are broken down • into fatty acids /glycerol 	(6)
Level	0	No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> • a limited description of enzyme action that includes at least three points • 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 enzyme action that includes at least six points • 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 at least nine points • 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
5(d)	<p>An explanation linking three of the following points</p> <ul style="list-style-type: none"> • (E) more /fast / maximises diffusion / absorption (1) • (S) microvilli (1) • (E) large surface area (1) • (S) single layer of cells / one cell thick / thin walls (1) • (E) small diffusion distance (1) • (S) capillary network / good blood supply / capillaries inside villus (1) • (E) maintains diffusion gradient (1) 	<p>To award all three marks at least one structure (S) and explanation (E) must be linked together.</p> <p>Award once, linked to any structure Ignore efficient (in stem) / easier</p> <p>Reject ref to cell wall</p>	(3)

Question Number	Answer	Acceptable answers	Mark
6(a)	<p>A description including the following linked points</p> <ul style="list-style-type: none"> • ref to a gene (coding for protein)(1) • sequence of bases determines sequence of amino acids (1) • idea of one code / triplet / codon / 3 bases (for one amino acid) (1) • several amino acids make up a protein / (poly)peptide (1) • transcription / detail of transcription (1) • translation / detail of translation (1) 	<p>Accept on either DNA or RNA base pairs</p> <p>Accept a chain of amino acids</p> <p>eg mRNA made</p> <p>eg mRNA attached to ribosome</p>	(4)

Question Number		Indicative Content	Mark
QWC	*6(b)	<p>A description including some of the following points in a logical sequence</p> <p>Points relating to DNA structural features:</p> <ul style="list-style-type: none"> • two strands • double helix • (contains) bases • A, T, C, G • adenine / A paired with thymine / T • guanine / G paired with cytosine / C • hydrogen / H bonds joining bases <p>Contributions from Scientists:</p> <ul style="list-style-type: none"> • X-ray (crystallography) being used • to show helical structure • to show diameter of molecule • how base pairs are arranged was shown • how strands are arranged was shown • modelling • reference to using other people's ideas 	(6)
Level	0	No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> • a limited description that includes either: at least three DNA features OR one contribution • 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 that includes at least three features of DNA and at least one contribution OR two features of DNA and two contributions. • 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 the structure of DNA that includes at least three features and two contributions. • 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>An explanation to include two of the following points linked together</p> <ul style="list-style-type: none"> • genes / base sequence (on human chromosome) identified (1) • identification of faulty / mutated genes (1) • people can be tested for a genetic disorder (1) • ref to development of gene therapy (1) • idea that appropriate /early /personalised / genomic medication / counselling can be given (1) 	<p>Accept base pair sequence gene map</p> <p>Accept idea that genes can be linked to disease</p> <p>Accept diagnosis of cancer</p> <p>Accept a description of gene therapy</p>	(2)

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