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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: • 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: • (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)**

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	• 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)	• 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 • 95% will be smaller / that height or smaller OR 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)	• (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)	Any three from the following: • 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)	Accept stops Ignore breathing Accept body Accept not enough oxygen /oxygenated blood	**(3)**

Question Number	Answer	Acceptable answers	Mark
3(b)	Any three from the following: • (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)	A suggestion including any three linked points • 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)	Any named enzyme must be in correct context. Ignore plasmids Reject replace	**(3)**

Question Number	Answer	Acceptable answers	Mark
4(b)	• in the phloem (1)	Accept phonetic spelling e.g. phloem /flowem	**(1)**

Question Number	Answer	Acceptable answers	Mark
4(c)(i)	A description including two of the following points • 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)	Accept decreases for 1 mark (if no other marks awarded) ecf throughout	**(2)**

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

Question Number	Answer	Acceptable answers	Mark
4(d)(i)	• number of **species** increase / go up (1)	Ignore number of weeds	**(1)**

Question Number	Answers	Acceptable answers	Mark
4(d)(ii)	Suggestions including two of the following linked points • 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)	Ignore ref to evolution / natural selection Ignore immune (to herbicide) Accept a description eg continued use of herbicide Accept cross breeding / reproduction / contamination	**(2)**

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

Question Number	Answer	Acceptable answers	Mark
5(b)	• neutralisation (of stomach acid) / raise pH (1) • emulsification / break down of fats (1)	Accept makes stomach / intestine contents more alkaline Accept breaks down large droplets /globules / increases surface area of fats Reject molecules broken down	**(2)**

Question Number		Indicative Content	Mark
QWC	***5(c)**	A description including some of the following points in a logical sequence Names of enzymes: • carbohydrases • named carbohydrase eg amylase • proteases • named protease eg pepsin • lipases • named lipase General points about enzyme action: • 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 Specific points: • 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**	• 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**	• 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**	• 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)	An explanation linking three of the following points • (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)	To award all three marks at least one structure (S) and explanation (E) must be linked together. Award once, linked to any structure Ignore efficient (in stem) / easier Reject ref to cell wall	**(3)**

Question Number	Answer	Acceptable answers	Mark
6(a)	A description including the following linked points • 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)	Accept on either DNA or RNA base pairs Accept a chain of amino acids eg mRNA made eg mRNA attached to ribosome	**(4)**

Question Number		Indicative Content	Mark
QWC	***6(b)**	A description including some of the following points in a logical sequence Points relating to DNA structural features: • 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 Contributions from Scientists: • 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**	• 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**	• 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**	• 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)	An explanation to include two of the following points linked together • 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)	Accept base pair sequence gene map Accept idea that genes can be linked to disease Accept diagnosis of cancer Accept a description of gene therapy	**(2)**

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