edexcel

Mark Scheme (Results)

November 2012

GCSE Biology
5BI2H/01

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk for our BTEC qualifications.
Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

If you have any subject specific questions about this specification that require the help of a subject specialist, you can speak directly to the subject team at Pearson. Their contact details can be found on this link: www.edexcel.com/teachingservices.

You can also use our online Ask the Expert service at www.edexcel.com/ask. You will need an Edexcel username and password to access this service.

Pearson: helping people progress, everywhere
Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

November 2012
Publications Code UG034044

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 • 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 • 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)	Any **two** from the following • to produce medicines/vaccines / hormones /insulin / clotting factors (1) • an appropriate advantage (1)	 ignore details of modification e.g. cure diseases, for diabetes, less likely to be rejected, avoids use of animals, produces large quantities, can be used by vegans Allow an appropriate advantage of golden rice	 **(2)**

Question Number	Answer	Acceptable answers	Mark
2(a)	A description that includes two of the following • 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)	• 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)	G G C T A G T T G **C C G A U C A A C** [all correct = 2 marks and 1 mistake = 1 mark]	**(2)**

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)	A description including two of the following • it rises between the temperatures of 15(^{o}C) and 35(^{o}C) (1) • water loss decreases after 35(^{o}C) (1) • credit correct reference to figures from the table, if related to temperature (1)	ignore any explanation given, including ref to transpiration award one mark for : water loss went up and then went down eg. greatest water loss at 35(^{o}C) there is less water loss at 45(^{o}C) than at 35(^{o}C)	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(b)(iii)	A suggestion including any two from the following: • 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)	 ignore ref to water loss from pot or roots ignore accurate and reliable	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(c)	An explanation including any two from the following: • glucose production will decrease (1) • photosynthesis will decrease (with increase in waterloss)(1) • as water is used in photosynthesis (1)	 glucose production stops photosynthesis will stop / is less efficient accept from a correct equation	**(2)**
Question Number	Answer	Acceptable answers	Mark
3(d)	A description including **two** from the following: • osmosis (1) • from high concentration to low concentration / down a concentration gradient (1) • through a partially permeable membrane (1)	 not active transport, but ignore diffusion correct references to water potential and solute potential not from where there are more water molecules semi permeable and selectively permeable	**(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)**

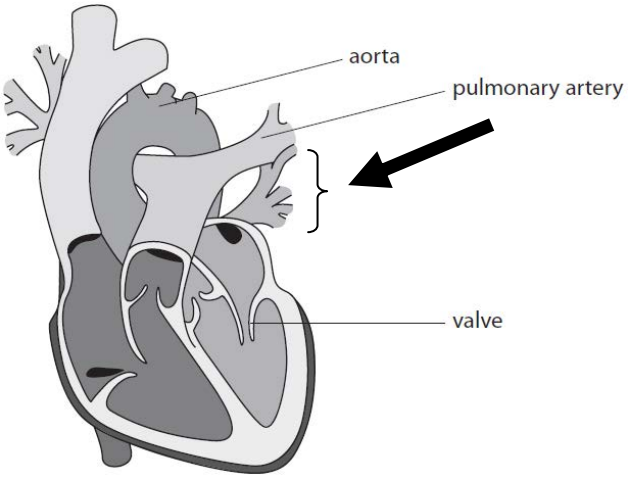
Question Number	Answer	Acceptable answers	Mark
4(b)(i)	protease / pepsin	**Reject** any other enzyme given	**(1)**

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

Question Number	Answer	Acceptable answers	Mark
4(b)(iii)	• 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)	Any **two** of the following points • 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 • neutralisation of stomach acid • 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)		ignore any labels on the arrow allow an arrow coming out of the opening of pulmonary vein into heart	**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	Any **two** from the following: • (blood in pulmonary artery) deoxygenated (1) • (blood in pulmonary artery) lower pressure (1)	accept reverse argument for aorta carrying less oxygen / no oxygen less force / slower	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(a)(iii)	Any **two** from the following: • prevent backflow (1) • (from ventricle) into atrium (1)	description of backflow ignore references to left atrium and deoxygenated blood	**(2)**

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

Question Number		Indicative Content	Mark
QWC	***5(b)(ii)**	A description including • 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	**0**	No rewardable content	
1	**1 - 2**	• 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**	• 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**	• 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)	A description including four of the following points • 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)	 do not accept if there is a 't' cells have one set of chromosomes / 23 chromosomes	**(4)**

Question Number		Indicative Content	Mark
QWC	***6(b)**	A description including • 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**	• 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**	• 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**	• 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)	Any **two** from the following: • 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)	ignore any reference to meiosis or mitosis sexual reproduction results in variation but asexual reproduction does not	**(2)**

T

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467
Fax 01623 450481
Email publication.orders@edexcel.com

Order Code UG034044 November 2012

For more information on Edexcel qualifications, please visit our website
www.edexcel.com

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE

Ofqual

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Rewarding Learning