edexcel

Mark Scheme (Results)

January 2016

Pearson Edexcel International Advanced Level in Biology (WBI01) Paper 01 - Lifestyle, Transport, Genes and Health

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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.

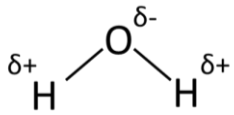
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.

- 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	Additional Guidance	Mark
1(a)(i)	D 		**(1)**

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	B hydrogen bonding		**(1)**

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	(glucose is a){polar molecule / forms hydrogen bonds with water} ;	**ALLOW** description of hydrophilic or hydroxyl groups being attracted to water Do not accept reference to hydrolysis **IGNORE** description of water molecules e.g. water is polar **IGNORE** reference to charge or ionic	**(1)**

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	1. triglycerides are insoluble (in water) / eq ; 2. as lipoproteins / as LDL / as HDL ; 3. formed into vesicles / micelles ;	1. **ACCEPT** idea that triglycerides are hydrophobic / nonpolar 2. **ACCEPT** idea that they are attached to protein 3. **ACCEPT** chylomicrons	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(a)(i)	B catalyse the conversion of fibrinogen to fibrin ;		(1)

Question Number	Answer	Additional Guidance	Mark
2(a)(ii)	A calcium ;		(1)

Question Number	Answer	Additional Guidance	Mark
2(a)(iii)	B present in an inactive form in the blood ;		(1)

Question Number	Answer	Additional Guidance	Mark
2(b)	**(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence)** 1. (folded into) large number of alveoli ; 2. (providing) large surface area ; 3. walls of {alveoli / capillary} are thin ; 4. (the walls) are made from a single layer of flattened cells ; 5. idea that (thin walls) ensures short diffusion distance ; 6. idea of a (extensive) capillary network ; 7. maintains a concentration gradient ;	**(QWC emphasis on clarity of expression)** 2. **IGNORE** large surface area to volume ratio 3. must make reference to 'walls' 4. **ACCEPT** single layer of squamous epithelial cells 6. **ACCEPT** lots of capillaries / many capillaries / surrounded by capillaries / covered by capillaries	**(5)**

Question Number	Answer	Additional Guidance	Mark
2(c)	1. reduces the flow of blood {to the lungs / through the blood vessels } ; 2. decreases the {concentration gradient / diffusion rate} ;	1. **IGNORE** unqualified references to blocking of blood vessels 1. **ACCEPT** a named type of blood vessel	**(2)**

Question Number	Answer	Additional Guidance	Mark
3(a)(i)	different countries have different population sizes / number of people in each country may differ ;		**(1)**

Question Number	Answer	Additional Guidance	Mark
3(a)(ii)	48 000 ÷ 31 000 000 ; = 155 ;	Correct answer without working gains full marks **ACCEPT** alternative valid working **ACCEPT** 154.8	**(2)**

Question Number	Answer	Additional Guidance	Mark
3(a)(iii)	1. genetic difference ; 2. dietary difference ; 3. different age profiles ; 4. lifestyle difference qualified ; 5. another lifestyle difference qualified ; 6. healthcare difference ;	All marking points must be in the context of comparing the countries 1. **ACCEPT** ethnic differences 2. different {calorie / energy} intake 4 & 5. smoking / exercise / alcohol consumption / stress	**(3)**

Question Number	Answer	Additional Guidance	Mark
3(b)(i)	1. (statins) inhibit the synthesis / production of cholesterol (in the liver) 2. reducing (total) blood cholesterol levels ; 3. raises HDL levels / increases HDL : LDL ratio / lowers LDL ;	1. **ACCEPT** inhibits enzyme that synthesises cholesterol / HMG-CoA reductase	**(2)**

Question Number	Answer	Additional Guidance	Mark
3(b)(ii)	1. muscle {inflammation / pain / eq} ; 2. liver {damage / failure / eq} ; 3. joint {aches / pains / eq} ; 4. nausea / constipation / diarrhoea ; 5. kidney {damage / failure / eq} ; 6. cataracts ; 7. diabetes ; 8. allergies / skin inflammation / skin rash / eq ; 9. respiratory problems / persistent cough / eq ; 10. headaches / dizziness / depression ;	4. **ACCEPT** poor absorption of vitamins 8. **ACCEPT** unqualified inflammatory response	**(2)**

Question Number	Answer	Additional Guidance	Mark
4(a)(i)	B non-polar and hydrophobic		**(1)**

Question Number	Answer	Additional Guidance	Mark
4(a)(ii)	A carbon and hydrogen only		**(1)**

Question Number	Answer	Additional Guidance	Mark
4(a)(iii)	A an ester bond		**(1)**

Question Number	Answer	Additional Guidance	Mark
4(b)(i)	as the ratio increases membrane fluidity decreases / as the ratio decreases membrane fluidity increases **Or** negative correlation / inversely proportional ;	**ACCEPT** fluidity decreases as the ratio increases	**(1)**

Question Number	Answer	Additional Guidance	Mark
4(b)(ii)	1.3 – 1.1 **Or** = 0.2 ; = 15.4 (%) ;	Correct answer gains full marks **IGNORE** signs **ACCEPT** 15.38 (%)	**(2)**

Question Number	Answer	Additional Guidance	Mark
4(b)(iii)	1. combines with fatty acid tails ; 2. holds / pulls the fatty acid chains together ; 3. reducing movement of the {phospholipid / fatty acid tails};		**(2)**

Question Number	Answer	Additional Guidance	Mark
4(c)	1. active transport (of potassium ions) ; 2. requiring {energy / ATP} ; 3. idea of involvement of membrane proteins ;	**IGNORE** reference to concentration gradients **ALLOW** carrier proteins / Na^+ / K^+ pump	**(2)**

Question Number	Answer	Additional Guidance	Mark
4(d)	1. water {moves / diffuses} into the cells ; 2. by osmosis ; 3. from region of high water concentration (outside cell) to region of low water concentration (inside the cell) ; 4. idea that {stress on membrane components increases / overcomes adhesion between molecules} ;	**ALLOW** • from region of high water potential (outside cell) to region of low water potential (inside the cell) • from a region of low solute concentration to a region of high solute concentration **ALLOW** idea that high / increase in pressure (causes cell to burst)	**(3)**

Question Number	Answer	Additional Guidance	Mark
5(a)(i)	it is only expressed in the homozygous condition / eq ; **Or** it is expressed in the absence of the dominant allele / eq ;	 **ACCEPT** it is not expressed in the presence of the dominant allele	**(1)**

Question Number	Answer	Additional Guidance	Mark
5(a)(ii)	1. alteration in DNA ; 2. change in base {sequence / quantity} / eq ;	 **ACCEPT** named type of mutation **ACCEPT** codon / nucleotide if in correct context **Note:** 'A change in the base sequence of DNA' gains both marks	**(2)**

Question Number	Answer	Additional Guidance	Mark
5(b)	**(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence)** 1. change in {DNA triplet / codons} ; 2. results in different {amino acids / amino acid sequence / primary structure} / eq ; 3. different R groups / different position of R groups ; 4. idea that this may change the bonding / named example of bonding ; 5. change in folding ; 6. therefore changing the {shape / structure} of the active site ; 7. idea that enzyme is unable to combine with its substrate ;	**(QWC emphasis on logical sequence)**	**(5)**

Question Number	Answer	Additional Guidance	Mark
5(c)	1. idea that less glucose available (from breakdown of glycogen to glucose) ; 2. idea that glucose is required {to provide ATP / to provide energy / for respiration} ;		**(2)**

Question Number	Answer	Additional Guidance	Mark
5(d)(i)	chorionic villus sampling / amniocentesis ;	**ACCEPT** CVS / sampling chorionic villus	**(1)**

Question Number	Answer	Additional Guidance	Mark
5(d)(ii)	idea that it is a rare condition / there may not be a family history of this condition ;	**ACCEPT** idea of cost or availability of testing **IGNORE** no carriers in family	**(1)**

Question Number	Answer	Additional Guidance	Mark
5(d)(iii)	Stated risk associated with testing ;	**ACCEPT** harm to fetus, miscarriage, abortion, inaccurate results / false results / false positive / false negative / difficulty in getting insurance	**(1)**

Question Number	Answer	Additional Guidance	Mark
6(a)	1. idea that animals have a small surface area to volume ratio ; 2. idea that diffusion alone is not sufficient ; 3. heart needed to {pump / move / eq} blood (around the body) ; 4. reference to mass flow ; 5. transport of {a named molecule / heat} ; 6. idea that animals have a high metabolic rate ;	**ALLOW** low surface area to volume ratio 4. **IGNORE** mass transport 6. **ACCEPT** animals have a high energy demand	**(4)**

Question Number	Answer	Additional Guidance	Mark
6(b)	1. idea that wall of the aorta is {thick / contains collagen} 2. to withstand pressure ; 3. wall of the aorta contains {elastic fibres / elastic tissue / elastin} ; 4. allowing (the wall of) the aorta to stretch and recoil ; 5. (recoil) helps to maintain {high pressure / rapid flow / eq} ; 6. (semilunar) valve present (at the start of aorta) ; 7. that prevents back flow of blood (during diastole) ;	**MP1 & MP3** must refer to the 'wall' **3. ACCEPT** description of wall	**(4)**

Question Number	Answer	Additional Guidance	Mark
7(a)	1. idea of (extracting) juice from the broccoli; 2. use DCPIP ; 3. idea of titration (of juice) / eq ; 4. correct colour change described ; 5. record {volume / number of drops} added ; 6. idea of a calibration curve / use of a standard vitamin C solution ;	e.g. add juice 'drop by drop' to DCPIP / or converse **IGNORE** descriptions of vitamin C being added to DCPIP 4. Blue to colourless if juice added to DCPIP, Colourless to blue if DCPIP added to juice **IGNORE** decolourised	**(4)**

Question Number	Answer	Additional Guidance	Mark
7(b)(i)	1. the longer the cooking time the greater the reduction in vitamin C in both methods ; 2. boiling causes greater reduction / microwaving causes less reduction ;		**(2)**

Question Number	Answer	Additional Guidance	Mark
7(b)(ii)	broccoli used to be of same {type / plant / mass / age / preparation } ;	**IGNORE** same size **IGNORE** reference to more repeats	**(1)**

Question Number	Answer	Additional Guidance	Mark
7(b)(iii)	1. boiling damages cell membranes ; 2. boiling increases permeability of membranes ; 3. vitamin C moves out of the cells ; 4. by diffusion ;	**ALLOW** a description of damage lipid membranes melt / membrane proteins are denatured **IGNORE** reference to cell wall	**(3)**

Question Number	Answer	Additional Guidance	Mark
8(a)	1. the chance / probability (of an event) ; 2. in one {group / person} compared to another ;	**IGNORE** references to risk	**(2)**

Question Number	Answer	Additional Guidance	Mark
8(b)	1. with less than 0.5 hours per week exercise, all three groups are at the same relative risk ; 2. BMI < 25.0, the risk of diabetes decreases with more exercise / eq ; 3. BMI 25.0 to 29.9, the risk decreases up to (2.0 to) 3.9 hours per week and then increases ; 4. BMI greater than 30.0, the risk of diabetes decreases with more exercise / eq ; 5. exercise has a greater effect on those with a BMI of < 25.0 (than on the other groups) ;	3. Can accept risk at first decreases and then increases from 4.0 to 6.9	**(3)**

Question Number	Answer	Additional Guidance	Mark
8(c)	1. individuals should take regular / more exercise ; 2. reduce energy intake ; 3. reduce BMI to less than 25 ;	**IGNORE** references to food types	**(3)**

Question Number	Answer	Additional Guidance	Mark
8(d)	Any one from: 1. cheap ; 2. efficient ; 3. easy ; 4. quick ; 5. fewer staff needed ; 6. idea that people are more likely to give an honest answer ; 7. Allows a large sample size		**(1)**

Question Number	Answer	Additional Guidance	Mark
8(e)	1. study only included women ; 2. all participants in {health / nursing / same} profession ; 3. all data collected by self-reporting ;		**(2)**

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