Pearson Edexcel

Mark Scheme (Results)

January 2019

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.
- Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

  i) ensure that text is legible, and that spelling, punctuation and grammar are accurate so that meaning is clear
  ii) select and use a form and style of writing appropriate to purpose and to complex subject matter
  iii) organise information clearly and coherently, using specialist vocabulary when appropriate.

Using the Mark Scheme

Examiners should look for qualities to reward rather than faults to penalise. This does NOT mean giving credit for incorrect or inadequate answers, but it does mean allowing candidates to be rewarded for answers showing correct application of principles and knowledge. Examiners should therefore read carefully and consider every response: even if it is not what is expected it may be worthy of credit.

The mark scheme gives examiners:

- an idea of the types of response expected
- how individual marks are to be awarded
- the total mark for each question
- examples of responses that should NOT receive credit.

/ means that the responses are alternatives and either answer should receive full credit.
( ) means that a phrase/word is not essential for the award of the mark, but helps the examiner to get the sense of the expected answer.
Phrases/words in **bold** indicate that the meaning of the phrase or the actual word is **essential** to the answer.
ecf/TE/cq (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

Candidates must make their meaning clear to the examiner to gain the mark. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct context.

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- write legibly, with accurate use of spelling, grammar and punctuation in order to make the meaning clear
- select and use a form and style of writing appropriate to purpose and to complex subject matter
- organise information clearly and coherently, using specialist vocabulary when appropriate.

Full marks will be awarded if the candidate has demonstrated the above abilities. Questions where QWC is likely to be particularly important are indicated (QWC) in the mark scheme, but this does not preclude others.

Question Number	Answer	Additional Guidance	Mark
1(a)(i)	**The only correct answer is C**	**A** is incorrect because **B** is incorrect because **D** is incorrect because	**(1)**

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	**The only correct answer is C**	**A** is incorrect because **B** is incorrect because **D** is incorrect because	**(1)**

Question Number	Answer	Additional Guidance	Mark
1(a)(iii)	**The only correct answer is C**	**A** is incorrect because **B** is incorrect because **D** is incorrect because	**(1)**

Question Number	Answer	Additional Guidance	Mark
1(a)(iv)	**The only correct answer is B**	**A** is incorrect because **B** is incorrect because **D** is incorrect because	**(1)**

Question Number	Answer	Additional guidance	Mark
1(b)	1. DNA is {double stranded / has a double helix} **and** RNA is {single stranded / does not have a double helix} ; 2. DNA contains (the sugar) deoxyribose, RNA contains ribose ; 3. DNA is {larger / longer} than RNA ;	Mp1 I-chain/coiled only I-ref to bases Mp2 A-correct description of structure eg ref to oxygen on C2 MP3 A- converse	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(c)(i)	1. 6.5 and 1.9 i.e. oleic and linoleic correctly identified ; 2. 6.5 + 1.9 = 8.4 ; 3. 8.4 × 0.7 = 5.88 / 5.9/6.0 ;	Correct answer, with no working shown gains 3 marks 8.4 only gains mp 1 and 2 If saturated fats chosen then allow 1 mark for 64.12/64.1/64	**(3)**

Question Number	Answer	Additional Guidance	Mark
1(c)(ii)	1. coconuts had a different {genotype / species/type/batch/source/age/eq} ; 2. they are grown in different conditions/environments ; 3. storage {time / conditions} will affect the relative amounts ;	Mp1 A-genetics I-mass/size/volume Mp2 A-named biotic or abiotic factor eg type of soil/minerals/light intensity/temperature	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(a)(i)	1. time for one cardiac cycle = 0.7 to 0.74 (secs) ; 2. 60 ÷ cycle time = 85.7 (bpm) ;	A-ecf from mp1 0.71=84.51 0.72=83.3 0.73=82.19 0.74=81.08	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(a)(ii)	4.8 to 5.1 (kPa)		**(1)**

Question Number	Answer	Additional Guidance	Mark
2(a)(iii)	0.13 to 0.14 (secs)		**(1)**

Question Number	Answer	Additional Guidance	Mark
2(b)	1. the pressure increases as the atrium {fills/contracts/eq} ; 2. the pressure decreases as {the atrium begins to empty/the AV valve opens/blood enters (left) ventricle} ;	Mp1 A-atrial systole A-blood enters or flows into atrium Mp2 A-atrial diastole A-bicuspid valve	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(c)	1. right ventricle pumps blood to the {lungs/pulmonary circulation} AND the left ventricle pumps blood {all around the body / to systemic circulation/eq} ; 2. idea that a high pressure (in RV) would cause {damage / eq} to the {lungs / capillaries /alveoli/eq} ;	Mp1 both parts needed for mark Mp2 A converse ie low pressure prevents damage/eq	**(2)**

Question Number	Answer	Additional Guidance	Mark
3(a)(i)	1. vessel A is an artery B is a vein ;	A-plural ie arteries and veins	**(1)**

Question Number	Answer	Additional Guidance	Mark
3(a)(ii)	1. endothelium reduces {friction/resistance} ; 2. smooth muscle contracts to reduce/change the diameter of the vessel ; 3. elastic tissue to stretch **and** recoil to maintain pressure ;	Mp1 I- allow blood to flow smoothly Mp2 A constricts Mp3 A-expands as eq to stretch and constrict as eq to recoil Mp3 NOT to withstand pressure	**(3)**

Question Number	Answer	Additional Guidance	Mark
3(b)	1. veins contain valves to prevent backflow/eq ;	NOT one direction/unidirectional	**(1)**

Question Number	Answer	Additional Guidance	Mark
3(c)(i)	1. prevents formation of a {blood clot / thrombus / embolism / eq} ; 2. reduces {effectiveness / eq} of platelets ; 3. there is less chance of artery blockage/blood flows normally through arteries ; 4. maintains oxygen supply (to tissues) ; 5. less risk of a heart attack/stroke/eq ;	Mp1 NOT atheroma/atherosclerosis 2. **Accept** reduces stickiness Mp3 I blood vessel Mp2/3/4 A converse in context	**(3)**

Question Number	Answer	Additional Guidance	Mark
3(c)(ii)	haemorrhage/internal bleeding / excessive bleeding/stomach ulcers /liver problems/kidney problems/nausea/headache/dizziness/irritation to stomach lining/eq ;	NOT-lowers blood pressure A-ref to increased bleeding I-bleeding only	**(1)**

Question Number	Answer	Additional Guidance	Mark
3(c)(iii)	antihypertensive / statin / platelet inhibitory (drug) ;	A-diuretics I- named drugs	**(1)**

Question Number	Answer	Additional Guidance	Mark
4(a)(i)	the combination of alleles/eq ;		**(1)**

Question Number	Answer	Additional Guidance	Mark
4(a)(ii)	1. the characteristics of an organism / eq ; 2. determined by genotype and the environment/eq ;	Mp1 A features/appearance/traits Mp2 A genes for genotype	**(2)**

Question Number	Answer	Additional Guidance	Mark
4(b)(i)	**The only correct answer is A**	**B** is incorrect because **C** is incorrect because **D** is incorrect because	**(1)**

Question Number	Answer	Additional Guidance	Mark
4(b)(ii)	1. correct genotypes of parents 3 and 4 eg Aa x Aa ; 2. correct gametes A a A a ; 3. genotype correctly linked to phenotype ie aa is affected or has disease ; 4. correct probability-0.25 / 25% / ¼ / 1 in 4 ;	A ecf from MP1 A-use of any letter Mp2 A gametes in Punnett square...don't need to be circled Penalise use of diff letters once eg Ab Mp4 NOT 1:4	**(4)**

Question Number	Answer	Additional Guidance	Mark
4(c)(i)	1. idea of {isolating/extracting/removing/eq} the {unaffected/normal/healthy/eq} gene ; 2. use of a vector / named vector ; 3. introduction of a vector into **cells** ; 4. idea that tyrosinase is synthesized/produced ;	Mp1 A-allele MP2 accept liposome / gene gun/virus/bacteria/plasmid Mp4 A-enzyme/protein NOT gene I-normal gene replaces faulty gene I-ref to short term/repeats	**(3)**

Question Number	Answer	Additional Guidance	Mark
4(c)(ii)	1. it may cause {harm/damage/miscarriage/death/eq} to the fetus ; 2. there is a risk of a false {positive/negative} /inaccurate result ; 3. resulting in the {loss/abortion/eq} of a {healthy/unaffected/eq} fetus ; 4. idea of who has the right to decide if tests are performed? ;	Mp1 A- abortion A-embryo NOT baby Mp4 A-fetus has a right to life I-religious/cultural reasons I-playing God	**(2)**

Question Number	Answer	Additional Guidance	Mark
5(a)	1.**(**primary structure is the) {order / sequence} of amino acids ; 2. (primary structure) affects /determines {positioning / types} of bonds ; 3. between R-groups ; 4. affects the {folding/ secondary structure/tertiary structure} ;	Mp1 NOT bases Mp2 A-named type of bond eg ionic/disulfide/hydrogen NOT-peptide bonds Mp4 A-named types eg alpha helix/beta pleated sheet	**(3)**

Question Number	Answer	Additional Guidance	Mark
5(b)(i)	1. idea that {fewer/no} chloride ions will leave the cell ; 2. CFTR is a channel protein ; 3. idea that mutation leads to {fewer / no} chloride ions {binding to / passing through} the CFTR protein ;	Mp1 A-chloride ions stay in/accumulate in the cell A correct chemical formula I-ions only A- chlorine ion but NOT chlorine only	**(2)**

Question Number	Answer	Additional Guidance	Mark
5(b)(ii)	1. by {enzymes / proteases} ; 2. by hydrolysis / by addition of water ; 3. correct ref to peptide bond ;	Mp2 A- H_2O	**(2)** **EXP**

Question Number	Answer	Additional Guidance	Mark
5(c)	1. more chloride ions in the cells / eq ; 2. water moves into the cell by osmosis ; 3. mucus produced is {thicker / stickier / more viscous / eq} ; 4. this blocks the {trachea /airways / bronchi / bronchioles / alveoli} ; 5. less oxygen reaches the alveoli ;	Mp1 A-less move out A-stay/accumulate in cell Mp2 A-water does not move out of the cell by osmosis Mp3 A thick/sticky Mp5 I lungs	**(4)**

Question Number	Answer	Additional Guidance	Mark
6(a)	1. identify correct general trend i.e. freeze-drying reduces vitamin C content / converse ; 2. the difference is {greatest in guava / least in mango} ; 3. credit correct manipulation of data linked to mp1 or 2 ;	Mp2 I-maximum difference Mp3 guava (8-5.2)/8 x100 =35% or 2.8mg/g mango (1.6-1.4)/1.6 x100= 12.5% or 0.2mg/g papaya (4.2-2.4)/4.2=42.86 or 42.9% or 1.8mg/g	**(3)**

Question Number	Answer	Additional Guidance	Mark
*6(b)	**(QWC – logical sequence)** 1. idea of obtaining the {juice / extract/pulp} from all three fruits ; 2. correctly named controlled variable ; 3. reference to DCPIP ; 4. titration or description of titration ; 5. correctly described colour change ; 6. record the volume needed (for a colour change) ; 7. ref to standardisation / calibration to determine the vitamin C concentration ; 8. repeat experiment and calculate a {mean/average} ;	Mp2 A age/ripeness same mass of fruit/volume of solvent/conc or volume of DCPIP in context I-amount/concentration of juice mp4.e.g. adding juice dropwise to DCPIP/converse mp5 adding DCPIP=colourless to blue adding juice=blue to colourless NOT blue-black mp6 A-count no of drops needed I-amount mp7 A use of graph/calculation(in correct context)	**(6)**

Question Number	Answer	Additional Guidance	Mark
*7(a)	**(QWC – clarity of expression)** 1. alveoli {are one cell thick/have a thin wall} ; 2. capillaries {are one cell thick/have a thin wall} ; 3. idea of short diffusion distance ; 4. alveoli covered with capillaries / eq ; 5. idea of large surface area provided by {alveoli/ capillaries} ; 6. concentration gradient is maintained by {ventilation/ breathing/eq } ; 7. concentration gradient is maintained by {blood flow/eq} ; 8. (these features) increase rate of diffusion of {gases/carbon dioxide/oxygen} ;	Mp1 and 2 I-thin only Mp5 I-large SA/V ratio	**(6)**

Question Number	Answer	Additional Guidance	Mark
7(b)(i)	pulmonary artery ;	A-pulmonary arteries	**(1)**

7(b)(ii)	1. there is separation of oxygenated and deoxygenated blood ; 2.idea of creating a {steep/high/eq} oxygen concentration gradient ; 3. increased rate of diffusion of oxygen into bloodstream ; 4.(therefore) more oxygen can be delivered to cells ; 5. as desert rats {are active / have a high rate of metabolism /are warm blooded/ eq} ;	Mp1 A-they do not mix Mp2 I-maintaining gradient Mp4 I-delivered more quickly Mp5 I have a large SA/V ratio	**(3)**

Question Number	Answer	Additional Guidance	Mark
8(a)	**The only correct answer is C**	**A** is incorrect because **B** is incorrect because **D** is incorrect because	**(1)**

Question Number	Answer	Additional Guidance	Mark
8(b)	1.idea that the volume of cytoplasm is more / the cell has expanded ; 2. water has entered (the cell) by osmosis ; 3. the {sodium chloride /glucose/solute} concentration inside the RBC is higher than the concentration {outside the cell/in solution B} ;	Mp1 A cell has increased in volume/size/is larger or bigger or swollen I-turgid NOT has grown Mp3 A-converse ie solute concentration outside lower than inside Mp3 A correct ref to hypotonic/hypertonic Mp3 I-ions only I-ref to water potential	**(3)**

Question Number	Answer	Additional Guidance	Mark
8(c)	**The only correct answer is C**	**A** is incorrect because **B** is incorrect because	**(1)**

		D is incorrect because	

Question Number	Answer	Additional Guidance	Mark
8(d)	1. ions move {down a concentration gradient/from high to low concentration/eq} ; 2. by diffusion ; 3. ions move {against the concentration gradient/from low to high concentration/eq} ; 4.by active transport ;	Mp1 I-along/across Mp2 NOT facilitated diffusion Mp1/2 and 3/4 need to be correctly linked ie 2 and 4 are not independent marks	**(3)**

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