

# Mark Scheme (Results)

## Summer 2019

Pearson Edexcel GCE
In Biology Spec B (9BI0) Paper 01
Advanced Biochemistry, Microbiology and Genetics

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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.

**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.

In questions marked with an **asterisk** (*), marks will be awarded for the ability to structure answers logically showing how the points are related or follow on from each other where appropriate.

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>1(a)</td><td>
<table>
<tr><th rowspan="2">Component</th><th colspan="4">Component found in a molecule of</th></tr>
<tr><th>both DNA and mRNA</th><th>DNA but not mRNA</th><th>mRNA but not DNA</th><th>neither DNA nor mRNA</th></tr>
<tr><td>Adenine</td><td>X</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>Hydrogen bonds</td><td>☐</td><td>X</td><td>☐</td><td>☐</td></tr>
<tr><td>Pentose sugar</td><td>X</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>Uracil</td><td>☐</td><td>☐</td><td>X</td><td>☐</td></tr>
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</td><td></td><td></td></tr>
</table>

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>1(b)(i)</td><td>An explanation that makes reference to two of the following:<br><br>• {DNA / fragments} {are negatively charged / have a phosphate group} (1)<br><br>• therefore the {DNA / fragments} move {when a potential difference is applied / towards the positive electrode} (1)<br><br>• {smaller / lighter} fragments move further / {larger / heavier} fragments move shorter distance (1)</td><td>ACCEPT current / charge / voltage / electric field<br>towards (positive) anode<br>ACCEPT small fragments faster / larger fragments slower</td><td></td></tr>
</table>

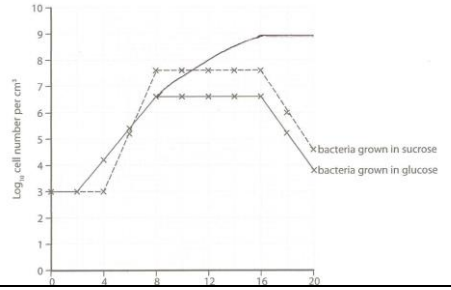
| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **1(b)(ii)** | 7 / 7.0 / 8 / 8.0 / 9 / 9.0 (kb) | | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **2(a)** | **B** monosaccharide disaccharide | **A** is incorrect because sucrose is a disaccharide<br>**C** is incorrect because glucose is a monosaccharide<br>**D** is incorrect because glucose is a monosaccharide and sucrose is a disaccharide | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **2(b)(i)** | • values read from graph per unit time and converted back from logs<br><br>• subtraction of each pair and division done | (7.6=) 39 810 717<br>and (6.6=) 3 981 072<br>and (3.0=) 1000 or (4.2=) 15849<br><br>15 / 10 / 10.04<br><br>**ACCEPT** 1.9 / 1.92 / 2 / 82.5 / 82.54 / 83 for 1 mark if slopes of graph used but no mention of the exponential growth rate constant (*k)* | |

| | | | |
|---|---|---|---|
| | **OR**<br><br>• exponential growth rate constant (*k*) calculated and used | **ACCEPT** *k* values calculated (3.820598 / 3.82 and 1.99335548 / 1.99) for 1 mark and *k* sucrose divided by *k* glucose = 1.9 **/** 1.92 / 2 for 2 marks | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **2(b)(ii)** | An explanation that makes reference to the following:<br><br>• (lag phase longer as) {sucrose has to be broken down / enzymes to breakdown sucrose had to be synthesised} (1)<br><br>• (reproduction faster) because sucrose has more {sugar / monosaccharides / energy} (1) | **ACCEPT** converse for glucose<br><br>**ACCEPT** sucrase<br><br>**ACCEPT** sucrose made of glucose and fructose / sucrose is a disaccharide and glucose is a monosaccharide | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **2(b)(iii)** | • a line that continues to go up after 8 hours and then levels off (around) 16 hours without dropping |  | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **3(a)** | **B** *Puccinia* | **A** is incorrect because *Plasmodium* is a protoctista that causes malaria<br>**C** is incorrect because *Salmonella* is a bacteria that causes food poisoning<br>**D** is incorrect because *Staphylococcus* is a bacteria that causes food poisoning | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **3(b)** | An explanation that makes reference to three of the following:<br><br>• (stem rust) fungus {takes up / uses} {nutrients / glucose / amino acids} (1)<br><br>• less {glucose to form starch / amino acids to form protein} (1)<br><br>• (stem rust) fungus interferes with vascular tissue (1)<br><br>• consequence of damaged vascular tissue (1) | **ACCEPT** glucose for respiration (by the plant)<br><br>e.g. weakened stems , less magnesium ions for chlorophyll, less sucrose to transport to roots | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **3(c)** | An answer that makes reference to three of the following:<br><br>• because {meiosis / sexual reproduction / basidiospore production} results in {genetically different fungi / variation} (1)<br><br>• because of {crossing over / random assortment / independent assortment} (1)<br><br>• because of mutation (in the DNA) (1)<br><br>• the {asexual cycle / production of uredinospores} results in more stem rust fungus that plants are not resistant to (1) | **ACCEPT** recombinants<br><br>**ACCEPT** only in the context of causing variation<br><br>**DO NOT ACCEPT** meiosis causes mutation<br><br>**ACCEPT** clones of stem rust fungus that plants are not resistant to | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **4(a)(i)** | **B** matrix | **A** is incorrect because crista are folds in the membrane<br>**C** is incorrect because stroma is in chloroplasts<br>**D** is incorrect because thylakoids are in chloroplasts | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **4(a)(ii)** | An explanation that makes reference to the following:<br><br>• because the resolution of the microscope used for **P** is {lower / worse} (1)<br><br>• to distinguish {the small distance between the two membranes / the membranes as separate structures} (1) | **ACCEPT** converse for **Q** throughout<br><br>**DO NOT ACCEPT** magnification<br><br>**ACCEPT** (inter membrane) space can be seen between membranes / the inner and outer membrane can be seen/ two lines can be seen | |

| Question Number | Indicative content |
|---|---|
| ***4(b)** | Answers will be credited according to candidates' deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme.<br><br>The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant.<br><br>Indicative content:<br><br>• membranes both made of phospholipid bilayer with embedded proteins<br><br>• lipid content is the phospholipid bilayer<br><br>• phospholipids needed for {fluidity / compartmentalisation}<br><br>• higher protein : lipid ratio in the inner membrane / more protein compared to lipid in the inner membrane<br><br>• protein content equals lipid content in outer membrane<br><br>• role of inner membrane is oxidative phosphorylation / chemiosmosis / synthesise ATP<br><br>• inner membrane contains proteins involved in electron transport<br><br>• inner membrane contains ATPase channels<br><br>• movement of protons through ATPase channels results in ATP formation<br><br>• proteins in outer membrane to allow pyruvate to pass through |

| | | |
|---|---|---|
| **Level 0** | Marks | No awardable content |
| **Level 1** | 1-2 | An explanation may be attempted but with limited interpretation or analysis of the scientific information with a focus on mainly just one piece of scientific information.<br><br>The explanation will contain description of membrane structure<br><br>1 mark = 2 points<br>2 marks = 3 points |
| **Level 2** | 3-4 | An explanation will be given with occasional evidence of analysis, interpretation and/or evaluation of both pieces of scientific information.<br><br>The explanation shows some linkages between the two membranes and their lipid and protein content<br><br>3 marks = explanation of ATPase or electron transport proteins or outer membrane<br>4 marks = explanation of two from ATPase, electron transport proteins, outer membrane |
| **Level 3** | 5-6 | An explanation is made which is supported throughout by sustained application of relevant evidence of analysis, interpretation and/or evaluation of both pieces of scientific information.<br><br>The explanation shows a well-developed and sustained line of scientific reasoning which relates named protein molecules to the high protein content of the inner membrane<br><br>5 marks = explanation of ATPase, electron transport proteins and outer membrane<br>6 marks = clear, accurate account of oxidative phosphorylation |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **5(a)(i)** | {methyl group / $CH_3$} added to a {base (cytosine or adenine) / cytosine / adenine / CpG site} | **DO NOT ACCEPT** between cytosine and guanine<br><br>**ACCEPT** A for adenine, C for cytosine, G for guanine | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **5(a)(ii)** | A description that makes reference to the following:<br><br>• {zygote / morula} are totipotent stem cells as they give rise to all cell types<br>(1)<br><br>• {blastocyst / inner cell mass} contains pluripotent cells that give rise to the cells of the embryo (and not the extra embryonic tissue) / most cell types<br>(1)<br><br>• cells in the developing embryo are multipotent as they become only some cell types<br>(1) | **ACCEPT** references to early and late stages of development if clear from description which stages are being referred to<br><br>**ACCEPT** cleavage cells<br><br>**ACCEPT** {trophoblastic cells / cells around the outside of the blastocyst} as they become extra embryonic tissue<br><br>**N.B.** If correct description given for 2 or more types of stem cell but no reference to embryo, award 1 mark | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **5(a)(iii)** | An explanation that makes reference to two of the following:<br><br>• level of DNA methylation increases after the blastocyst stage} (1)<br><br>• because genes {switched off / silenced / inactivated / cannot be transcribed / cannot be expressed} (1)<br><br>• causing cells to become {specialised / differentiated} (1) | | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **5(b)** | An explanation that makes reference to two of the following:<br><br>• because they are (fully) differentiated cells (1)<br><br>• therefore genes needed (for other cell types) are (permanently) {switched off / silenced} (1)<br><br>• therefore proteins needed by other cell types cannot be produced (1) | **ACCEPT** specialised<br><br>**ACCEPT** not able to express certain genes | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **6(a)** | An explanation that makes reference to two of the following:<br><br>• MHC needed if endothelial cells were to {present antigen / be antigen presenting cells} (1)<br><br>• antigen binds to MHC molecules (1)<br><br>• MHC-antigen complex involved in activation of T helper cells (1) | <br><br><br><br>**ACCEPT** antigens presented on MHC<br><br>**ACCEPT** MHC-antigen complex binds to (CD4) receptor on T helper cells | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **6(b)** | An explanation that makes reference to two of the following:<br><br>• because stops DNA replication in endothelial cells (1)<br><br>• dividing cells {take up / use} the (radioactive) thymidine (1)<br><br>• so that any radioactive thymidine uptake will be by the T cells (only) (1) | **N.B. '**They' or 'cells' refers to the endothelial cells<br><br><br><br>**ACCEPT** DNA synthesis uses thymidine<br><br>**ACCEPT** only T cell division can be measured | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **6(c)** | An explanation that makes reference to the following:<br><br>• to remove any thymidine (not taken up)<br>(1)<br><br>• which would result in an over estimate of the {number of T cells / thymidine present}<br>(1) | **ACCEPT** {inaccurate / not valid} result for the T cells | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **6(d)(i)** | An explanation that makes reference to the following:<br><br>• to determine any passive uptake of radioactive thymidine / to see if T cells take up thymidine without antigen present<br>(1)<br><br>• to show that antigen is stimulating the T cells (to divide)<br>(1) | **ACCEPT** to compare the thymidine with and without antigen<br><br>**ACCEPT** to see the effect of antigen (on T cells) | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **6(d)(ii)** | An explanation that makes reference to three of the following:<br><br>• endothelial cells are best at presenting Con A (and MBP) / Con A (and MBP) are presented (1)<br><br>• endothelial cells are least effective at presenting OVA (and PPD) / OVA (and PPD) are not presented (1)<br><br>• because there is very little difference between antigen and {no antigen / control} (1)<br><br>• because {error bars for Con A and MBP are not overlapping / error bars for OVA and PPD are overlapping} with the control (1) | **N.B.** Con A (and MBP) have the highest level of thymidine and OVA (and PPD) the least = 1 mark if no other marks awarded | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **7(a)** | An explanation that makes reference to the following:<br><br>• because {cholesterol / fatty acids} are hydrophobic (so cannot be carried in bloodstream)<br>(1)<br><br>• phospholipid tails are hydrophobic so {cholesterol / fatty acids} can be carried inside lipoprotein (1)<br><br>• {protein / phospholipid heads} in lipoprotein are hydrophilic (enabling transport in bloodstream)<br>(1) | **ACCEPT** non-polar<br><br>**ACCEPT** non-polar<br><br>**ACCEPT** polar | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **7(b)(i)** | • substitution of values into equation<br><br>• answer given to 3 or 4 sig figs | $4/3 \times \pi \times 11 \times 11 \times 11$ / 5572.453<br><br>5570 / 5572<br><br>**ACCEPT** 5580 / 5575 for 1 mark | |

| Question Number | Answer | | Mark |
|---|---|---|---|
| **7(b)(ii)** | An explanation that makes reference to two of the following:<br><br>• because (in the LDL) there is less protein (contained in a larger volume) (1)<br><br>• because the protein is denser than the phospholipid (in the LDL) (1)<br><br>• (the LDL has) {a larger hole in the middle / fewer molecules in relation to its size} (1) | **ACCEPT** converse statements for HDL<br><br>**ACCEPT** types of protein in HDL are denser than the types in LDL | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **7(b)(iii)** | An explanation that makes reference to four of the following:<br><br>• because cholesterol is a risk factor (1)<br><br>• (because of raised LDLs) more cholesterol in the blood (1) | | |

| | | | |
|---|---|---|---|
| | • {cholesterol / plaque / atheroma} builds up in (walls of) artery (1)<br><br>• reducing the flow of blood to the heart {tissue / cells} (1)<br><br>• therefore lack of oxygen for (aerobic) respiration (in heart cells) (1) | | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **8(a)(i)** | • length of scale line given in μm<br><br>• magnification calculated | 1.7 × 10000 / 17000<br><br>$1.7\times10^{3}$ / $0.0017 \times 10^{6}$ | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **8(a)(ii)** | width of GM aperture divided by width of non-modified aperture | In the range of 1.3 to {4 / 4.0} to no more than 1 decimal place<br>**DO NOT ACCEPT** with units or % | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **8(b)(i)** | A description that makes reference to the following:<br><br>• (µmol) carbon dioxide used / {oxygen / GP / GALP / glucose} made (1)<br><br>• ($m^{-2}$) is the area of the {leaf / open stomata} (1)<br><br>• ($s^{-1}$) in one second (1) | **ACCEPT** example e.g. measure for 120 seconds and divide by 120 | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **8(b)(ii)** | An explanation that makes reference to three of the following:<br><br>• increase in light intensity increases photosynthesis (1)<br><br>• increase is greater in GM plants because the wider aperture will result in a more {gas exchange / uptake of carbon dioxide} (1)<br><br>• therefore {light-independent reactions / Calvin cycle / carbon fixation} is faster (1)<br><br>• rate levels off when {another factor / carbon dioxide concentration / temperature} becomes rate limiting (1) | **ACCEPT** GM plants photosynthesise faster than non-GM<br><br>**ACCEPT** carbon dioxide not limiting the rate of {light-independent reactions / Calvin cycle / carbon fixation} | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **8(c)** | An explanation that makes reference to three of the following:<br><br>• because (faster photosynthesis will result in) more {GALP / glucose} produced (1)<br><br>• to form a named plant molecule (1)<br><br>• because transpiration stream will be faster (1)<br><br>• therefore more mineral ions for named product (1) | **ACCEPT** biomass / other organic molecules<br>more {oxygen / glucose} for ATP production<br><br>**e.g.** $Mg^{++}$ for chlorophyll, nitrates for protein | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **8(d)(i)** | **D** ATP is broken down into ADP and phosphate ions by a hydrolysis reaction | **A** is incorrect because ATP is broken down<br>**B** is incorrect because ATP is broken down<br>**C** is incorrect because condensation reactions form bonds | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **8(d)(ii)** | **A** malate lowers the water potential of the cytoplasm | **B** is incorrect because increase in solute concentration raises water potential so water would leave the cells<br>**C** is incorrect because starch has no osmotic effect<br>**D** is incorrect because starch has no osmotic effect | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **8(d)(iii)** | **D** The guard cells become larger and the inner wall of the guard cell is less flexible than the outer wall | **A** is incorrect because entry of water would make the cell more larger<br>**B** is incorrect because entry of water would make the cell more larger<br>**C** is incorrect because the stoma would not form if the inner wall was flexible | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **9(a)** | An explanation that makes reference to five of the following:<br><br>• DNA synthesis is needed for {mitosis / cell division} (1)<br><br>• Dox prevents {DNA synthesis / DNA strands separating / promotors binding} (1)<br><br>• because the strands are not available (for nucleotides to align) (1)<br><br>• Dox prevents {transcription / transcription factors from binding} (1)<br><br>• so no proteins synthesised (1)<br><br>• repair enzyme will not be able to remove the drug (1) | **ACCEPT** without DNA synthesis the cell will remain in interphase<br><br>**ACCEPT** mRNA cannot be made<br><br>**ACCEPT** {cell cycle stops / cells destroyed} if damaged DNA is not repaired | |

| Question Number | Indicative content |
|---|---|
| ***9(b)(i)** | Answers will be credited according to candidates' deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme.<br><br>The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant.<br><br><u>Indicative content</u><br><br>• Dox decreases the concentration of (all) amino acids shown<br><br>• largest actual decrease is glu and asp (3.6 μmol $cm^{-3}$)<br><br>• smallest actual decrease is ser (0.9 μmol $cm^{-3}$))<br><br>• relative decrease is least for pro (16.67%)<br><br>• relative decrease is greatest for asp (85.71%)<br><br>• data not available for all amino acids<br><br>• polar and non-polar amino acids are affected<br><br>• polar amino acids affected most (total 14.4 μmol $cm^{-3}$ compared to total 11.7 μmol $cm^{-3}$ / mean 2.4 μmol $cm^{-3}$ compared to mean 1.95 μmol $cm^{-3}$)<br><br>• effect on non-polar amino acids is within a {narrower range for actual decrease / wider range for percentage decrease} |

| | | |
|---|---|---|
| | **Level 1 : comments on overall effect of Dox**<br><br>1 mark = level 1 comment only<br>2 marks = level 1 comment backed up with figures / level 2 comment but no figures given<br><br>**Level 2 : comments on effect of Dox on polar and non-polar amino acids**<br><br>3 marks = level 2 comment only / level 1 comment with a level 2 calculation (= actual decrease in concentration)<br>4 marks = level 2 comment backed up with a level 2 calculation<br><br>**Level 3 : comments about amino acids within the group of polar / non-polar amino acids**<br><br>5 marks = level 3 comment / level 2 comment with a level 3 calculation (= percentage decrease in calculation)<br>6 marks = comment backed up with a level 3 calculation | |
| **Level 0** | Marks | No awardable content |
| **Level 1** | 1-2 | An **answer** may be attempted but with limited interpretation or analysis of the scientific information with a focus on mainly just one piece of scientific information.<br><br>The **answer** will contain basic information with some attempt to describe the data shown in the graph |
| **Level 2** | 3-4 | An **answer** will be given with occasional evidence of analysis, interpretation and/or evaluation of both pieces of scientific information.<br><br>The **answer** shows some linkages and lines of scientific reasoning with some structure between the graph and the different types of amino acids |
| **Level 3** | 5-6 | An **answer** is made which is supported throughout by sustained application of relevant evidence of analysis, interpretation and/or evaluation of both pieces of scientific information.<br><br>The **answer** shows a well-developed and sustained line of scientific reasoning which is clear and logically structured. |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **9(b)(ii)** | An explanation that makes reference to the following:<br><br>• a decrease in some amino acids may mean that {certain proteins cannot be formed / less protein made}<br>(1)<br><br>• if these proteins are involved in heart muscle structure then it will be weaker<br>(1)<br><br>• these proteins may affect heart muscle function<br>(1) | **ACCEPT** named example e.g. actin, myosin, collagen<br><br>**ACCEPT** named example e.g. collagen, haemoglobin, myoglobin, cytochromes | |

| Question Number | Answer | Additional Guidance | Mark |
|---|---|---|---|
| **9(b)(iii)** | An explanation that makes reference to the following:<br><br>• heart will not be able to pump as well<br>(1)<br><br>• so less {oxygenated blood / oxygen} will be delivered to the {cells / tissues / organs / named example}<br>(1)<br><br>• example of a consequence of this<br>(1) | **ACCEPT** less carbon dioxide removed / lowers blood pH<br><br>**e.g.** less aerobic respiration, build-up of lactic acid / fatigue / breathlessness | |

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