

**EDEXCEL • GCSE BIOLOGY 1B10**

# Higher Tier — Paper 2

June 2025 exam series

**MARK SCHEME**

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# Mark Scheme (Results)

Summer 2025

Pearson Edexcel GCSE  
In Biology (1BI0)  
Paper 2H

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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 have been developed so that the rubrics of each mark scheme reflects the characteristics of the skills within the AO being targeted and the requirements of the command word. So for example the command word 'Explain' requires an identification of a point and then reasoning/justification of the point. Explain questions can be asked across all AOs. The distinction comes whether the identification is via a judgment made to reach a conclusion, or, making a point through application of knowledge to reason/justify the point made through application of understanding. It is the combination and linkage of the marking points that is needed to gain full marks.

When marking questions with a 'describe' or 'explain' command word, the detailed marking guidance below should be consulted to ensure consistency of marking.

| Assessment Objective |           | Command Word                                                                                                                    |                                                                                                                                         |
|----------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Strand               | Element   | Describe                                                                                                                        | Explain                                                                                                                                 |
| AO1                  |           | An answer that combines the marking points to provide a logical description                                                     | An explanation that links identification of a point with reasoning/justification(s) as required                                         |
| AO2                  |           | An answer that combines the marking points to provide a logical description, showing application of knowledge and understanding | An explanation that links identification of a point (by applying knowledge) with reasoning/justification (application of understanding) |
| AO3                  | 1a and 1b | An answer that combines points of interpretation/evaluation to provide a logical description                                    |                                                                                                                                         |
| AO3                  | 2a and 2b |                                                                                                                                 | An explanation that combines identification via a judgment to reach a conclusion via justification/reasoning                            |
| AO3                  | 3a        | An answer that combines the marking points to provide a logical description of the plan/method/experiment                       |                                                                                                                                         |
| AO3                  | 3b        |                                                                                                                                 | An explanation that combines identifying an improvement of the experimental procedure with a linked justification/reasoning             |

**Biology 1BI0\_2H**

| Question number | Answer                                                                                                                                                     | Mark       |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>1(a)</b>     | A description including: <ul style="list-style-type: none"><li>• use iodine (1)</li><li>• (if the banana turns) blue-black starch is present (1)</li></ul> | <b>(2)</b> |

| Question number | Answer                                                                                                                                                                                                          | Additional guidance                               | Mark       |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------------|
| <b>1(b)</b>     | A description including: <ul style="list-style-type: none"><li>• use Benedict's reagent (1)</li><li>• <b>heat</b> the sample (with Benedict's reagent) (1)</li><li>• the sample turns (brick) red (1)</li></ul> | <b>accept</b> yellow, green, orange for brick red | <b>(3)</b> |

| Question number | Answer                                                                                                                                                                     | Mark       |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>1(c)</b>     | An explanation including <b>two</b> from: <ul style="list-style-type: none"><li>• (as bananas ripen) starch is converted to glucose (1)</li><li>• by enzymes (1)</li></ul> | <b>(2)</b> |

**Total for Question 1 = 7 marks**

| Question number | Answer                                                                                                                                                                                                                                                                | Additional guidance                                                                                         | Mark       |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------|
| <b>2(a)</b>     | <p>A description including:</p> <ul style="list-style-type: none"> <li>(pathogens) get stuck in the mucus (1)</li> <li><b>cilia</b> {move / waft} the {pathogens / mucus} (1)</li> <li>to the throat / up the {trachea / bronchiole} / to be swallowed (1)</li> </ul> | <p>accept micro-organisms for pathogens</p> <p>accept hairs for cilia</p> <p>accept away from the lungs</p> | <b>(2)</b> |

| Question number | Answer                                                                                                                                                                                                                                                     | Additional guidance                                                                                                                                     | Mark       |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>2(b)</b>     | <p>An explanation linking two from:</p> <ul style="list-style-type: none"> <li>glucose and oxygen (1)</li> <li>(to form) carbon dioxide and water (1)</li> <li>in an exothermic reaction (1)</li> <li>which takes place in the mitochondria (1)</li> </ul> | <p>accept <math>C_6H_{12}O_6 + O_2</math></p> <p>accept <math>CO_2 + H_2O</math></p> <p>accept correct equation for aerobic respiration for 2 marks</p> | <b>(2)</b> |

| Question number | Answer                       | Additional guidance | Mark       |
|-----------------|------------------------------|---------------------|------------|
| <b>2(c) (i)</b> | to absorb the carbon dioxide | accept $CO_2$       | <b>(1)</b> |

| Question number | Answer                                                                            | Mark |
|-----------------|-----------------------------------------------------------------------------------|------|
| 2(c) (ii)       |  | (1)  |

| Question number | Answer                                                                                                                                                                                                                                          | Additional guidance                              | Mark |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------|
| 2(c)(iii)       | <p>An explanation linking two from:</p> <ul style="list-style-type: none"> <li>• (the drop) would move more slowly / shorter distance (1)</li> <li>• as less oxygen would be used (1)</li> <li>• so less respiration would occur (1)</li> </ul> | accept less carbon dioxide {produced / absorbed} | (2)  |

| Question number | Answer                                      | Mark |
|-----------------|---------------------------------------------|------|
| 2(c)(iv)        | repeat the investigation / calculate a mean | (1)  |

**Total for Question 2 = 9 marks**

| Question number | Answer                                                  | Mark |
|-----------------|---------------------------------------------------------|------|
| 3(a) (i)        | native (species) / (species) from the country of origin | (1)  |

| Question number | Answer                               | Additional guidance                    | Mark |
|-----------------|--------------------------------------|----------------------------------------|------|
| 3(a)(ii)        | quadrat / stated size of square area | accept {belt / line} transect / a grid | (1)  |

| Question number | Answer                      | Mark |
|-----------------|-----------------------------|------|
| 3(b)(i)         | increases / goes up / rises | (1)  |

| Question number | Answer                                                                                                                                                                                                                                                                                                                | Additional guidance | Mark |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------|
| 3(b)(ii)        | <p>The only correct answer is <b>B</b> species C</p> <p>A is incorrect because Species A is decreasing so will not out-compete</p> <p>C is incorrect because species D has only increased by 2 so will not out-compete B</p> <p>D is incorrect because species H is not present so will not out-compete species B</p> |                     | (1)  |

| Question number | Answer                                                                                                                                                                                                                    | Additional guidance                                                                                                                                             | Mark |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 3(b)(iii)       | <p>An explanation linking:</p> <ul style="list-style-type: none"> <li>taller / bigger / had larger leaves / had larger roots (1)</li> <li>(got more) water / minerals / nutrients / light / photosynthesis (1)</li> </ul> | <p>ORA</p> <p>accept grows / reproduces / takes up more space / higher population</p> <p>accept named minerals</p> <p>accept disease / eaten by animals (1)</p> | (2)  |

| Question number | Answer                                                                                                        | Mark       |
|-----------------|---------------------------------------------------------------------------------------------------------------|------------|
| <b>3(b)(iv)</b> | (seeds) blown in by the wind / (seeds) brought in by animals / {roots / shoots} <b>growing</b> under the wall | <b>(1)</b> |

| Question number | Answer                                                                                                                                                                                                                                                                                                       | Additional guidance                                                                     | Mark       |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------|
| <b>3(c)</b>     | <p>An explanation including two from:</p> <ul style="list-style-type: none"> <li>• through the root (hair cells) (1)</li> <li>• by <b>osmosis</b> (1)</li> <li>• across the {semi / partially} permeable membrane (1)</li> <li>• from a high water concentration to a low water concentration (1)</li> </ul> | accept down a concentration gradient / from high water potential to low water potential | <b>(2)</b> |

**Total for Question 3 = 9 marks**

| Question number | Answer                                                                                                                                                                | Additional guidance                                                                                                                                                                                                                                                            | Mark       |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>4(a)</b>     | <p>Measurement</p> <p>15 mm (1)</p> <p>Substitution</p> <p><math>15 \div 18\,000 = 0.00083</math> (1)</p> <p>Standard form</p> <p><math>8.3 \times 10^{-4}</math></p> | <p>accept correct answer for full marks with no working.</p> <p>accept 14mm –16mm<br/>accept reading in cm</p> <p>Accept 0.00078 / 0.00086 / 0.00089</p> <p>accept <math>8.9 \times 10^{-4}</math><br/><math>8.6 \times 10^{-4}</math><br/><math>7.8 \times 10^{-4}</math></p> | <b>(3)</b> |

| Question number | Answer                          | Mark       |
|-----------------|---------------------------------|------------|
| <b>4(b)(i)</b>  | 5 / 5.0 / 5.1 / 5.2 / 5.3 / 5.4 | <b>(1)</b> |

| Question number | Answer                                                                                                                                                                                                                                          | Mark       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>4(b)(ii)</b> | <p>A description including</p> <ul style="list-style-type: none"> <li>from pH 5 to pH 7 the growth of the bacterium increased (1)</li> <li>pH 7 is optimum (1)</li> <li>from pH 7 to pH 8.5 the growth of the bacteria decreased (1)</li> </ul> | <b>(2)</b> |

| Question number | Answer                                                                                                                                                                                                                                           | Mark |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 4(c)(i)         | <p><b>The only correct answer is D volume of the milk</b></p> <p>A is incorrect as pH is an dependent variable</p> <p>B is incorrect as temperature is a independent variable</p> <p>C is incorrect as incubation time is set by the student</p> | (1)  |

| Question number | Answer                                                                                                                                 | Additional guidance        | Mark |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------|
| 4(c)(ii)        | <p>An answer including:</p> <ul style="list-style-type: none"> <li>pH decreases (1)</li> <li>(from 6.6) to 4.8 / by 1.8 (1)</li> </ul> | accept becomes more acidic | (2)  |

| Question number | Answer                                                                                                 | Additional guidance                                                                    | Mark |
|-----------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------|
| 4(c)(iii)       | <p>Substitution</p> <p>Change in pH = 1.4 (1)</p> <p>Evaluation: answer divided by 72</p> <p>0.019</p> | <p>award full marks for correct answer with no working</p> <p>accept 0.0194 / 0.02</p> | (2)  |

**Total for Question 4 = 11 marks**

| Question number | Answer                                     | Mark |
|-----------------|--------------------------------------------|------|
| 5(a)(i)         | diffusion<br><br>accept phonetic spellings | (1)  |

| Question number | Answer                                                                                                                                                                                                                                                                | Additional Guidance                                                                            | Mark |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------|
| 5(a)(ii)        | Any two from: <ul style="list-style-type: none"> <li>• volume of water (1)</li> <li>• beaker (1)</li> <li>• temperature (1)</li> <li>• volume / concentration of food colouring (1)</li> <li>• pipette / {volume / size} <b>drop</b> of food colouring (1)</li> </ul> | ignore amount<br><br><br><br>accept the number of drops of food colouring<br><br>ignore amount | (2)  |

| Question number | Answer                                                                                                                                                                                                                                     | Mark |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 5(b)(i)         | plotted graph <ul style="list-style-type: none"> <li>• axes labelled with units (1)</li> <li>• X axis water temp / Y axis time (1)</li> <li>• linear scale (1)</li> <li>• correctly plotted points and line drawn correctly (1)</li> </ul> | (4)  |

| Question number | Answer                                                                                                                                                                                                                                                                   | Additional guidance                                        | Mark |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|------|
| 5(b)(ii)        | <p>An explanation linking two from:</p> <ul style="list-style-type: none"> <li>temperature increases (1)</li> <li>because the particles move faster / there are more collisions / particles diffuse faster (1)</li> <li>due to more <b>kinetic</b> energy (1)</li> </ul> | <p>accept particles {spread out / mixed} <b>faster</b></p> | (2)  |

**Total for Question 5 = 9 marks**

| Question number | Answer    | Mark |
|-----------------|-----------|------|
| 6(a)(i)         | eight / 8 | (1)  |

| Question number | Answer                                                                                           | Additional guidance    | Mark |
|-----------------|--------------------------------------------------------------------------------------------------|------------------------|------|
| 6(a)(ii)        | (gas leaving stomata) oxygen / water vapour (1)<br><br>(gas entering stomata) carbon dioxide (1) | accept correct formula | (2)  |

| Question number | Answer                                         | Mark |
|-----------------|------------------------------------------------|------|
| 6(a)(iii)       | to prevent {water loss / the plant drying out} | (1)  |

| Question number | Answer                                                                                                                                                                                                                                         | Additional guidance                                                                            | Mark |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------|
| 6(b)            | An answer linking three from: <ul style="list-style-type: none"> <li>place the slide on the stage (1)</li> <li>select the lowest objective lens (1)</li> <li>use the focusing wheel (1)</li> <li>select a higher objective lens (1)</li> </ul> | start on the lowest magnification<br><br>accept focus<br><br>accept increase the magnification | (3)  |

| Question number | Answer                                                                                                                                                                                                                           | Additional guidance                      | Mark |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------|
| 6(c)            | An explanation linking two from: <ul style="list-style-type: none"> <li>as sucrose (1)</li> <li>through the phloem (1)</li> <li>by translocation (1)</li> <li>active transport (1)</li> <li>by bidirectional flow (1)</li> </ul> | reject xylem<br><br>reject transpiration | (2)  |

**Total for Question 6 = 9 marks**

| Question number | Answer                                                                                              | Additional guidance                                                                                         | Mark       |
|-----------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------|
| <b>7(a)(i)</b>  | Substitution<br><br>$207 \div 2013$ (1)<br><br>answer $\times 100$ (1)<br><br>Evaluation<br><br>10% | Full marks for correct answer with no working<br><br><br><br><br><br><br><br>award 2 marks for 10.28 / 10.3 | <b>(3)</b> |

| Question number | Answer                                                                                                                                                                                                                                      | Mark       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>7(a)(ii)</b> | Any two from: <ul style="list-style-type: none"> <li>energy used keeping warm / thermoregulation (1)</li> <li>respiration (1)</li> <li>excretion (1)</li> <li>not all the organism is eaten / digested (1)</li> <li>movement (1)</li> </ul> | <b>(2)</b> |

| Question number  | Answer                                                                                                                                                                                              | Additional guidance                                                      | Mark       |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------|
| <b>7(a)(iii)</b> | An answer linking two from: <ul style="list-style-type: none"> <li>ladybirds eat aphids (1)</li> <li>so aphids cannot damage the rose plants (1)</li> <li>this is biological control (1)</li> </ul> | accept prey on aphids<br><br><br><br><br><br>accept roses remain healthy | <b>(2)</b> |

| Question number | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Additional guidance                                                                                                                                                        | Mark       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>7(b)</b>     | <p>A description including three from:</p> <ul style="list-style-type: none"> <li>• <b>increased</b> meat consumption (1)</li> <li>• <b>increased</b> animal farming (1)</li> <li>• environmental change / climate change (1)</li> <li>• pests / pathogens / disease (1)</li> <li>• biofuel production / growing crops for animals (1)</li> <li>• less land available for farming / building houses on land / deforestation (1)</li> <li>• drought / flood / famine / wild fires (1)</li> <li>• war / conflict (1)</li> </ul> | <p>accept overfishing / over farming of animals</p> <p>accept pollution / global warming</p> <p>accept solar farms / landfill</p> <p>accept increased food wastage (1)</p> | <b>(3)</b> |

**Total for Question 7 = 10 marks**

| Question number | Answer                                                                                                                                                                                                                                                       | Mark |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 8(a)(i)         | <p><b>The only correct answer is D chamber Q and R</b></p> <p>A is incorrect as chamber P contains deoxygenated blood</p> <p>B is incorrect as chamber S contains deoxygenated blood</p> <p>C is incorrect as chamber P and S contain deoxygenated blood</p> | (1)  |

| Question number | Answer                                                                                                                                                          | Additional guidance                                                                                     | Mark |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------|
| 8(a)(ii)        | <p>An explanation linking:</p> <ul style="list-style-type: none"> <li>prevents the backflow (of blood) (1)</li> <li>into the {(left) atrium / Q} (1)</li> </ul> | <p>accept blood flows in one direction</p> <p>accept from the (left) ventricle to the (left) atrium</p> | (2)  |

| Question number | Answer                                                                                                                                                                                                                                                                                       | Additional guidance                                                                                                                   | Mark |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|------|
| 8(b)            | <p>An explanation linking three from:</p> <ul style="list-style-type: none"> <li>pumps blood faster (1)</li> <li>to provide more oxygen / glucose (1)</li> <li>for increased respiration (1)</li> <li>more energy to the <b>muscles</b> (1)</li> <li>to remove carbon dioxide (1)</li> </ul> | <p>accept pumps more blood</p> <p>accept to prevent oxygen debt / prevent build-up of lactic acid / prevent anaerobic respiration</p> | (3)  |

| Question number | Answer                                                                                                                    | Additional guidance                                                                                    | Mark |
|-----------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------|
| 8(c)(i)         | Substitution<br>$190 \div 100 \times 65 / 0.65 \times 190$ (1)<br>Evaluation<br>123.5<br>Three significant figures<br>124 | full marks for correct answer with no working<br><br><br><br><br><br><br>Award 2 marks for 123 / 123.5 | (3)  |

| Question number | Answer                                                                                                                                                                                                                                                                                                                                                                       | Additional guidance                        | Mark |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|------|
| 8(c)(ii)        | An explanation linking three from: <ul style="list-style-type: none"> <li>no nucleus (to carry more oxygen) (1)</li> <li>biconcave {to allow more diffusion / to increase surface area} (1)</li> <li>{flexible / small / thin} to fit through <b>capillaries</b> (1)</li> <li>contain haemoglobin to bind oxygen (1)</li> <li>thin so short diffusion pathway (1)</li> </ul> | accept large SA:V ratio for more diffusion | (3)  |

**Total for Question 8 = 12 marks**

| Question number | Answer                                                                                                                                                                                                                                                                                                         | Additional guidance                                                                          | Mark       |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------|
| <b>9(a)(i)</b>  | <p>An answer including three from</p> <ul style="list-style-type: none"> <li>all three hormones are lower after the menopause (1)</li> <li>oestrogen levels went down by 10pg/mL (1)</li> <li>progesterone levels went down by 10.6ng/mL (1)</li> <li>testosterone levels went down by 19 ng/dL (1)</li> </ul> | <p>oestrogen down by 30%</p> <p>progesterone down by 96%</p> <p>testosterone down by 54%</p> | <b>(3)</b> |

| Question number | Answer                                                                                                                                                                                                                                                                                                                                                                    | Additional guidance                                                    | Mark       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------|
| <b>9(a)(ii)</b> | <p>An explanation linking three from:</p> <p>FSH linked to</p> <ul style="list-style-type: none"> <li>stimulates the follicle (to mature) (1)</li> <li>causes the ovum to mature (1)</li> <li>stimulates the production of oestrogen (1)</li> </ul> <p>LH linked to</p> <ul style="list-style-type: none"> <li>causes ovulation (1)</li> <li>corpus luteum (1)</li> </ul> | <p>accept egg for ovum</p> <p>accept causes the egg to be released</p> | <b>(3)</b> |

| Question number | Indicative content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Mark |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 9 *(b)          | <p style="text-align: center;"><b>AO1 and AO3 6 marks</b></p> <p><b>Healthy person</b></p> <ul style="list-style-type: none"> <li>• glucose is regulated insulin and glucagon</li> <li>• insulin released from the pancreas</li> <li>• lowers blood glucose</li> <li>• by converting glucose to glycogen</li> <li>• to be stored in the liver</li> <li>• glucagon released from the pancreas</li> <li>• raises blood glucose</li> <li>• by converting glycogen to glucose</li> </ul> <p><b>Type 2 diabetic</b></p> <ul style="list-style-type: none"> <li>• cells are resistant to insulin</li> <li>• so blood glucose levels remain high</li> <li>• control through diet and exercise</li> <li>• medication (metformin) given</li> <li>• inject insulin</li> <li>• to lower blood glucose concentration</li> <li>•</li> </ul> <p><b>Graph</b></p> <ul style="list-style-type: none"> <li>• glucose concentrations are higher for the person with type 2 diabetes</li> <li>• the range for a person who does not have type 2 diabetes is 90 – 125 mg/dL</li> <li>• the range for a person with type 2 diabetes is 135 – 200 mg/dL</li> <li>• there is a steeper rise in glucose concentrations for the person with type 2 diabetes</li> <li>• takes longer for glucose concentrations to drop in the person with type 2 diabetes</li> </ul> | (6)  |

| Level   | Mark | Descriptor                                                                                                                                                                                                                                                                                                                         |
|---------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | 0    | <ul style="list-style-type: none"> <li>no rewardable material.</li> </ul>                                                                                                                                                                                                                                                          |
| Level 1 | 1-2  | <ul style="list-style-type: none"> <li>demonstrates elements of biological understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail.</li> <li>presents an explanation with some structure and coherence.</li> </ul>                                                                              |
| Level 2 | 3-4  | <ul style="list-style-type: none"> <li>demonstrates biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and /or developed.</li> <li>presents an explanation that has a structure which is mostly clear, coherent and logical.</li> </ul> |
| Level 3 | 5-6  | <ul style="list-style-type: none"> <li>demonstrates accurate and relevant biological understanding throughout. Understanding of the scientific ideas is detailed and fully developed.</li> <li>presents an explanation that has a well-developed structure which is clear, coherent and logical.</li> </ul>                        |

### Additional Guidance

|         |     |                                                                                                                                                                                                                                                                                               |
|---------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Level 1 | 1-2 | <ul style="list-style-type: none"> <li>A brief comment of how blood glucose is regulated in either type 2 or a healthy person or a valid comment from the graph</li> <li>At least 2 comments from the graph OR a comment on glucose regulation and a comment on the graph</li> </ul>          |
| Level 2 | 3-4 | <ul style="list-style-type: none"> <li>A brief description of either healthy blood glucose regulation <b>OR</b> Type 2 diabetes blood glucose regulation <b>OR</b> a comment on both</li> <li>The response links to data on the graph</li> </ul>                                              |
| Level 3 | 5-6 | <ul style="list-style-type: none"> <li>A detailed explanation of the control of blood glucose for <b>both</b> people including the role of either insulin or glucagon</li> <li>The response links this to data on glucose levels on the graph and <b>both</b> insulin and glucagon</li> </ul> |

**Total for Question 9 = 12 marks**

| Question number | Answer                                                                                                                                                                                                                                               | Mark |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 10(a)(i)        | <p><b>The only correct answer is B letter T</b></p> <p>A is incorrect as letter S represents the Bowmans capsule</p> <p>C is incorrect as letter Q represents the loop of Henle</p> <p>D is incorrect as letter P represents the collecting duct</p> | (1)  |

| Question number | Answer                                                                                                                                                                                                                                | Mark |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 10(a)(ii)       | <p><b>The only correct answer is B letter S</b></p> <p>A is incorrect as letter T represents the glomerulus</p> <p>C is incorrect as letter R represents the PCT</p> <p>D is incorrect as letter P represents the collecting duct</p> | (1)  |

| Question number | Answer                                                                                                                                                                                                   | Additional guidance                                                 | Mark |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|------|
| 10(a)(iii)      | <p>A description linking two from:</p> <ul style="list-style-type: none"> <li>by the process of <b>selective</b> reabsorption (1)</li> <li>of glucose (1)</li> <li>using active transport (1)</li> </ul> | <p>accept where glucose is reabsorbed (back into the blood) (1)</p> | (2)  |

| Question number | Answer                                                                                                                                                                                      | Additional guidance                     | Mark       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------|
| <b>10(b)</b>    | <p>An answer linking:</p> <ul style="list-style-type: none"> <li>(ureters) transports urine from the <b>kidney</b> to the <b>bladder</b> (1)</li> <li>(bladder) stores urine (1)</li> </ul> | accept waste material or urea for urine | <b>(2)</b> |

| Question number | Indicative content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Mark       |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>10 *(c)</b>  | <p style="text-align: center;"><b>AO1 6 marks</b></p> <p><b>Nephron</b></p> <ul style="list-style-type: none"> <li>water passes through the nephron</li> <li>it is not reabsorbed</li> <li>osmoregulation is controlled by the hypothalamus</li> <li>message is sent to the pituitary gland</li> <li>to release less ADH</li> <li>less ADH travels in the bloodstream to the kidney</li> <li>It acts on the collecting duct / loop of henle</li> <li>Making it less permeable</li> <li>By closing aquaporin channels / protein channels</li> <li>To allow less water to be reabsorbed into the bloodstream</li> <li>increasing the amount of urine production</li> <li>urine is more dilute</li> </ul> | <b>(6)</b> |

| Level   | Mark | Descriptor                                                                                                                                                                                                                                                                                                                         |
|---------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | 0    | <ul style="list-style-type: none"> <li>no rewardable material.</li> </ul>                                                                                                                                                                                                                                                          |
| Level 1 | 1-2  | <ul style="list-style-type: none"> <li>demonstrates elements of biological understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail.</li> <li>presents an explanation with some structure and coherence.</li> </ul>                                                                              |
| Level 2 | 3-4  | <ul style="list-style-type: none"> <li>demonstrates biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and /or developed.</li> <li>presents an explanation that has a structure which is mostly clear, coherent and logical.</li> </ul> |
| Level 3 | 5-6  | <ul style="list-style-type: none"> <li>demonstrates accurate and relevant biological understanding throughout. Understanding of the scientific ideas is detailed and fully developed.</li> <li>presents an explanation that has a well-developed structure which is clear, coherent and logical.</li> </ul>                        |

## Additional Guidance

|         |     |                                                                                                                                                                                                                                                                                                                     |
|---------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Level 1 | 1-2 | <ul style="list-style-type: none"><li>• A brief explanation of how water levels are controlled in the blood</li><li>• Linked to hormonal control (hormones do not need to be named)</li></ul>                                                                                                                       |
| Level 2 | 3-4 | <ul style="list-style-type: none"><li>• A brief explanation of how the nephron acts to cause more water to be reabsorbed</li><li>• Linked to the hormone ADH</li></ul>                                                                                                                                              |
| Level 3 | 5-6 | <ul style="list-style-type: none"><li>• A detailed explanation of how water levels are controlled including the role of the collecting duct becoming less permeable <b>OR</b> not reabsorbing water</li><li>• Linked to the hormone ADH <b>AND</b> the role of the hypothalamus <b>OR</b> pituitary gland</li></ul> |

**Total for Question 10 = 12 marks**

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