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# GCSE BIOLOGY

PAPER 1H

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**Mark scheme**

Specimen 2018

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Version 1.0

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from [aqa.org.uk](http://aqa.org.uk)

## Information to Examiners

### 1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded
- the Assessment Objectives and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

### 2. Boldening and underlining

- 2.1** In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks boldened.– Each of the following bullet points is a potential mark.
- 2.2** A bold **and** is used to indicate that both parts of the answer are required to award the mark.
- 2.3** Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.
- 2.4** Any wording that is underlined is essential for the marking point to be awarded.

### 3. Marking points

#### 3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error / contradiction negates each correct response – So, if the number of error / contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as \* in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

| Student | Response | Marks awarded |
|---------|----------|---------------|
| 1       | green, 5 | 0             |
| 2       | red*, 5  | 1             |
| 3       | red*, 8  | 0             |

Example 2: Name two planets in the solar system. (2 marks)

| Student | Response                    | Marks awarded |
|---------|-----------------------------|---------------|
| 1       | Neptune, Mars, Moon         | 1             |
| 2       | Neptune, Sun, Mars,<br>Moon | 0             |

### 3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

### 3.3 Marking procedure for calculations

Marks should be awarded for each stage of the calculation completed correctly, as students are instructed to show their working.

Full marks can however be given for a correct numerical answer, without any working shown.

### 3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

### 3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward is kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation 'ecf' in the marking scheme.

### 3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

### 3.7 Brackets

(.....) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

### 3.8 Ignore / Insufficient / Do not allow

Ignore or insufficient are used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

Do not allow means that this is a wrong answer which, even if the correct answer is given as well, will still mean that the mark is not awarded.

## Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

### Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

### Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

You should ignore any irrelevant points made. However, full marks can be awarded only if there are no incorrect statements that contradict a correct response.

An answer which contains nothing of relevance to the question must be awarded no marks.

## Question 1

| Question     | Answers                                                                                                                                                                                                                                                                          | Extra information                                                                     | Mark       | AO / Spec. Ref.                            |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------|--------------------------------------------|
| 01.1         | active transport                                                                                                                                                                                                                                                                 |                                                                                       | 1          | AO1/1<br>4.1.3.3                           |
| 01.2         | by transpiration stream / pull<br><br>in xylem                                                                                                                                                                                                                                   |                                                                                       | 1<br><br>1 | AO1/1<br>4.2.3.2<br><br>AO1/1<br>4.2.3.1   |
| 01.3         | any <b>three</b> in the correct order from: <ul style="list-style-type: none"> <li>• mount epidermis on a slide</li> <li>• count stomata in one area</li> <li>• repeat in four more areas</li> <li>• repeat method on other surface of leaf</li> <li>• calculate mean</li> </ul> | allow nail varnish film                                                               | 3          | AO2/2<br>4.2.3.2                           |
| 01.4         | 1                                                                                                                                                                                                                                                                                | allow numbers written out in a line with middle number circled                        | 1          | AO2/2<br>4.2.3.2                           |
| 01.5         | $(44 + 41 + 40 + 42 + 39) / 5$<br>= 41.2<br><br>41                                                                                                                                                                                                                               | allow 41 with no working shown for <b>2</b> marks<br><br>allow 41.2 for <b>1</b> mark | 1<br><br>1 | AO2/2<br>4.2.3.2<br><br>AO2/2<br>4.2.3.2   |
| 01.6         | less water lost<br><br>so it does not wilt                                                                                                                                                                                                                                       |                                                                                       | 1<br><br>1 | AO3/1a<br>4.2.3.2<br><br>AO3/1b<br>4.2.3.2 |
| <b>Total</b> |                                                                                                                                                                                                                                                                                  |                                                                                       | <b>11</b>  |                                            |

## Question 2

| Question     | Answers                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Extra information   | Mark     | AO / Spec. Ref.                        |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------|----------------------------------------|
| 02.1         | to kill virus<br><b>or</b><br>to prevent virus spreading                                                                                                                                                                                                                                                                                                                                                                                                     |                     | 1        | AO2/2<br>4.3.1.2<br>4.3.3.1            |
| 02.2         | take (stem) cells from meristem<br><b>or</b><br>tissue culture                                                                                                                                                                                                                                                                                                                                                                                               | allow take cuttings | 1        | AO2/1<br>4.1.2.3                       |
| 02.3         | heat mixture and add a few drops of Benedict's solution                                                                                                                                                                                                                                                                                                                                                                                                      |                     | 1        | AO1/2<br>4.2.2.1<br>4.4.1.3            |
|              | glucose turns solution blue to orange                                                                                                                                                                                                                                                                                                                                                                                                                        |                     | 1        | AO1/2<br>4.2.2.1<br>4.4.1.3            |
| 02.4         | <b>Level 2:</b> A clear, logical and coherent explanation which links relevant content.                                                                                                                                                                                                                                                                                                                                                                      |                     | 3–4      | AO2/1<br>4.3.1.2<br>4.3.3.1<br>4.4.1.3 |
|              | <b>Level 1:</b> Some relevant content but explanation is incomplete or insufficiently linked.                                                                                                                                                                                                                                                                                                                                                                |                     | 1–2      |                                        |
|              | No relevant content                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     | 0        |                                        |
|              | <b>Indicative content</b><br><br><ul style="list-style-type: none"> <li>• less photosynthesis because of lack of chlorophyll</li> <li>• therefore less glucose made<br/>so</li> <li>• less energy released for growth</li> <li>• because glucose is needed for respiration<br/>and /or</li> <li>• therefore less amino acids / proteins / cellulose for growth</li> <li>• because glucose is needed for making amino acids / proteins / cellulose</li> </ul> |                     |          |                                        |
| <b>Total</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     | <b>8</b> |                                        |

**Question 3**

| Question | Answers                                                                                                                                                                                                                                                                                                                                                                                           | Extra information | Mark | AO / Spec. Ref.  |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------|------------------|
| 03.1     | any <b>two</b> from: <ul style="list-style-type: none"><li>• acid in stomach kills pathogens in food</li><li>• skin forms a barrier / produces antimicrobial secretions</li><li>• hairs in the nose trap (particles which may contain) pathogens</li><li>• trachea / bronchi has mucus which traps pathogens</li></ul> <b>or</b><br>bronchi have cilia which waft mucus to throat to be swallowed |                   | 2    | AO1/1<br>4.3.1.6 |

## Question 3 continued

| Question     | Answers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Extra information | Mark     | AO / Spec. Ref.  |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|------------------|
| 03.2         | <b>Level 3:</b> A clear, logical and coherent answer, with no significant redundancy. The student understands the process and links this to reasons for clinical trials.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   | 5–6      | AO1/2<br>4.3.1.9 |
|              | <b>Level 2:</b> A partial answer with errors and ineffective reasoning or linkage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   | 3–4      |                  |
|              | <b>Level 1:</b> One or two relevant points but little linkage of points or logical reasoning.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   | 1–2      |                  |
|              | No relevant content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                   | 0        |                  |
|              | <b>Indicative content</b> <ul style="list-style-type: none"> <li>• pre-clinical trials of the new drug on cells / tissues / live animals to test toxicity, dosage and efficacy</li> <li>• clinical trials / test on healthy volunteers and patients at very low doses</li> <li>• so that you can monitor for safety / side effects</li> <li>• and only then do trials to find the optimum dosage and test for efficacy</li> <li>• double blind trial / use of placebo</li> <li>• which does not contain the new drug</li> <li>• random allocation of patients to groups</li> <li>• so no one knows who has placebo / the new drug</li> <li>• peer review of data</li> <li>• to help prevent false claims</li> </ul> |                   |          |                  |
| <b>Total</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   | <b>8</b> |                  |

**Question 4**

| Question     | Answers                                                                   | Extra information                                                   | Mark     | AO / Spec. Ref.   |
|--------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|----------|-------------------|
| <b>04.1</b>  | glucose is absorbed by diffusion into the bloodstream                     |                                                                     | 1        | AO1/1<br>4.1.3.1  |
|              | then blood delivers glucose to muscles in capillaries                     |                                                                     | 1        | AO1/1<br>4.4.2.2  |
| <b>04.2</b>  | to stop air getting in                                                    |                                                                     | 1        | AO2/2<br>4.4.2.1  |
| <b>04.3</b>  | yellow                                                                    |                                                                     | 1        | AO2/2<br>4.4.2.1  |
| <b>04.4</b>  | collect the CO <sub>2</sub> / gas with a measuring cylinder / gas syringe |                                                                     | 1        | AO3/3b<br>4.4.2.1 |
|              | (volume collected) in a certain time using a timer / watch                |                                                                     | 1        | AO3/3b<br>4.4.2.1 |
| <b>04.5</b>  | yeast produces ethanol but muscles produce lactic acid                    | marks can be awarded from correct word or balanced symbol equations | 1        | AO1/1<br>4.4.2.1  |
|              | yeast produces CO <sub>2</sub> but muscles do not                         | answers must be comparative                                         | 1        | AO1/1<br>4.4.2.1  |
|              | both release small amounts of energy                                      | ignore both occur without oxygen                                    | 1        | AO1/1<br>4.4.2.1  |
| <b>Total</b> |                                                                           |                                                                     | <b>9</b> |                   |

## Question 5

| Question    | Answers                                                                                | Extra information                                                                | Mark | AO / Spec. Ref.   |
|-------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------|-------------------|
| <b>05.1</b> | $(0.15/1.35) \times 100$                                                               |                                                                                  | 1    | AO2/2<br>4.1.3.2  |
|             | 11.1 (%)                                                                               | allow 11.1 (%) with no working shown for <b>2</b> marks                          | 1    | AO2/2<br>4.1.3.2  |
| <b>05.2</b> | to allow results to be compared<br><b>or</b><br>they had different masses at the start |                                                                                  | 1    | AO2/2<br>4.1.3.2  |
| <b>05.3</b> | axis correct scale and labelled                                                        |                                                                                  | 1    | AO2/2<br>4.1.3.2  |
|             | 5 points correctly plotted                                                             | allow ecf from <b>05.1</b><br>allow <b>1</b> mark for 4 points correctly plotted | 2    | AO2/2<br>4.1.3.2  |
|             | line of best fit                                                                       |                                                                                  | 1    | AO2/2<br>4.1.3.2  |
| <b>05.4</b> | 0.5                                                                                    | allow 0.45–0.55                                                                  | 1    | AO3/2a<br>4.1.3.2 |
| <b>05.5</b> | (0.0 to 0.4) water moves into cells                                                    |                                                                                  | 1    | AO2/1<br>4.1.3.2  |
|             | (0.6 to 0.8) water leaves cells                                                        |                                                                                  | 1    | AO2/1<br>4.1.3.2  |
|             | by osmosis                                                                             |                                                                                  | 1    | AO1/1<br>4.1.3.2  |

Question 5 continues on the next page

**Question 5 continued**

| Question     | Answers                                                                                                                                                                                    | Extra information | Mark      | AO / Spec. Ref.   |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------|-------------------|
| <b>05.6</b>  | any <b>two</b> from: <ul style="list-style-type: none"><li>• concentration of solutions</li><li>• drying of chips</li><li>• accuracy of balance</li><li>• evaporation from tubes</li></ul> |                   | 2         | AO3/3a<br>4.1.3.2 |
| <b>Total</b> |                                                                                                                                                                                            |                   | <b>13</b> |                   |

**Question 6**

| Question     | Answers                                                                     | Extra information                                                        | Mark      | AO / Spec. Ref.   |
|--------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------|-------------------|
| <b>06.1</b>  | stomach and pancreas correctly labelled                                     |                                                                          | 1         | AO1/1<br>4.2.2.1  |
| <b>06.2</b>  | bacteria not killed (by stomach acid / HCl) and so they damage mucus lining |                                                                          | 1         | AO2/1<br>4.3.1.6  |
|              | so <u>acid / HCl</u> damages stomach tissue / causes an ulcer               | allow bacteria infect stomach tissue                                     | 1         | AO3/2b<br>4.3.1.6 |
| <b>06.3</b>  | if the cancer is malignant                                                  |                                                                          | 1         | AO1/1<br>4.2.2.7  |
|              | (cancer) cells can spread to other organs                                   |                                                                          | 1         | AO1/1<br>4.2.2.7  |
|              | via the blood forming a secondary tumour                                    | do not award marking points 2 or 3 without marking point 1               | 1         | AO1/1<br>4.2.2.7  |
| <b>06.4</b>  | add Biuret reagent to food sample                                           | allow sodium / potassium hydroxide (solution) + copper sulfate(solution) | 1         | AO1/2<br>4.2.2.1  |
|              | mauve / purple colour shows protein present                                 |                                                                          | 1         |                   |
| <b>06.5</b>  | damaged villi reduce surface area for absorption (of food molecules)        |                                                                          | 1         | AO3/2b<br>4.2.2.1 |
|              | (therefore) fewer amino acids and glucose absorbed                          |                                                                          | 1         | AO3/2b<br>4.2.2.1 |
|              | with less glucose transfer of energy from respiration is reduced            |                                                                          | 1         | AO3/2b<br>4.2.2.1 |
|              | and fewer amino acids available to build new proteins                       |                                                                          | 1         | AO3/2b<br>4.2.2.1 |
| <b>Total</b> |                                                                             |                                                                          | <b>12</b> |                   |

**Question 7**

| Question     | Answers                                                                                                                                       | Extra information                                                                                       | Mark     | AO / Spec. Ref.   |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------|-------------------|
| <b>07.1</b>  | compare them to (pictures in) a gardening manual / website                                                                                    |                                                                                                         | 1        | AO1/1<br>4.3.3.1  |
|              | send to laboratory (for testing)                                                                                                              |                                                                                                         | 1        | AO1/1<br>4.3.3.1  |
| <b>07.2</b>  | (nitrate) stunted growth                                                                                                                      |                                                                                                         | 1        | AO1/1<br>4.3.3.1  |
|              | (magnesium) yellowing of leaves                                                                                                               | allow chlorosis                                                                                         | 1        | AO1/1<br>4.3.3.1  |
| <b>07.3</b>  | (fertiliser <b>S</b> )                                                                                                                        |                                                                                                         |          |                   |
|              | has most nitrogen for good growth                                                                                                             | if no other marks awarded allow <b>1</b> mark for (fertiliser <b>s</b> ) has more minerals than compost | 1        | AO3/2a<br>4.3.3.1 |
|              | (and) has high(est) potassium content for stronger roots                                                                                      |                                                                                                         | 1        | AO3/2a<br>4.3.3.1 |
|              | (it is also) cheaper than fertiliser <b>T</b>                                                                                                 |                                                                                                         | 1        | AO3/2a<br>4.3.3.1 |
|              | (however) has less phosphate than fertiliser <b>T</b> (although more than compost) so flowers / fruit perhaps less important for the gardener |                                                                                                         | 1        | AO3/2a<br>4.3.3.1 |
| <b>Total</b> |                                                                                                                                               |                                                                                                         | <b>8</b> |                   |

**Question 8**

| Question     | Answers                                                                                                                                                                                                             | Extra information             | Mark     | AO / Spec. Ref.             |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------|-----------------------------|
| <b>08.1</b>  | vector                                                                                                                                                                                                              |                               | 1        | AO2/1<br>4.3.1.1<br>4.3.1.5 |
| <b>08.2</b>  | any <b>three</b> from: <ul style="list-style-type: none"> <li>• destroy the snails</li> <li>• isolate infected dogs</li> <li>• treat infected dogs</li> <li>• educate owners about picking up dog faeces</li> </ul> | allow vaccination             | 3        | AO2/1<br>4.3.1.1            |
| <b>08.3</b>  | stop mosquitoes breeding                                                                                                                                                                                            | allow correct description     | 1        | AO1/1<br>4.3.1.5            |
|              | use mosquito nets                                                                                                                                                                                                   | allow use of insect repellent | 1        | AO1/1<br>4.3.1.5            |
| <b>Total</b> |                                                                                                                                                                                                                     |                               | <b>6</b> |                             |

## Question 9

| Question     | Answers                                                         | Extra information                                            | Mark      | AO / Spec. Ref.   |
|--------------|-----------------------------------------------------------------|--------------------------------------------------------------|-----------|-------------------|
| 09.1         | C                                                               |                                                              | 1         | AO2/1<br>4.1.2.2  |
| 09.2         | cytoplasm <b>and</b> cell membrane dividing                     | accept cytokinesis for <b>1</b> mark                         | 1         | AO2/1<br>4.1.2.2  |
|              | to form two identical daughter cells                            |                                                              | 1         | AO2/1<br>4.1.2.2  |
| 09.3         | stage 4                                                         |                                                              | 1         | AO3/1a<br>4.1.2.2 |
|              | only one cell seen in this stage                                |                                                              | 1         | AO2/2<br>4.1.2.2  |
| 09.4         | $(4/36) \times 16 \times 60$                                    |                                                              | 1         | AO2/2<br>4.1.2.2  |
|              | 107 / 106.7                                                     |                                                              | 1         | AO2/2<br>4.1.2.2  |
|              | 110 (minutes)                                                   |                                                              | 1         | AO2/2<br>4.1.2.2  |
|              |                                                                 | allow 110 (minutes) with no working shown for <b>3</b> marks |           |                   |
| 09.5         | binary fission                                                  | do <b>not</b> accept mitosis                                 | 1         | AO1/1<br>4.1.1.6  |
| 09.6         | shortage of nutrients / oxygen                                  |                                                              | 1         | AO3/1a<br>4.1.1.6 |
|              | so cells die<br><b>or</b><br>death rate = rate of cell division |                                                              | 1         | AO3/1a<br>4.1.1.6 |
| <b>Total</b> |                                                                 |                                                              | <b>11</b> |                   |

**Question 10**

| Question     | Answers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Extra information | Mark     | AO / Spec. Ref.                                   |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------------------------------------------------|
| <b>10</b>    | <b>Level 3:</b> A detailed and coherent explanation is provided with most of the relevant content, which demonstrates a comprehensive understanding of the human circulatory system . The response makes logical links between content points.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   | 5–6      | AO1/1<br>4.1.1.3<br>4.1.3.1<br>4.2.2.2<br>4.2.2.3 |
|              | <b>Level 2:</b> The response is mostly relevant and with some logical explanation. Gives a broad understanding of the human circulatory system. The response makes some logical links between the content points.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   | 3–4      |                                                   |
|              | <b>Level 1:</b> Simple descriptions are made of the roles of some of the following: heart function, gas exchange, named blood vessels, named blood cells. The response demonstrates limited logical linking of points.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   | 1–2      |                                                   |
|              | No relevant content.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   | 0        |                                                   |
|              | <b>Indicative content</b> <ul style="list-style-type: none"> <li>dual / double circulatory system which means that it has higher blood pressure and a greater flow of blood to the tissues</li> <li>heart made of specialised (cardiac) muscle cells which have long protein filaments that can slide past each other to shorten the cell to bring about contraction for pumping blood</li> <li>heart pumps blood to lungs in pulmonary artery so that oxygen can diffuse into blood from air in alveoli</li> <li>blood returns to heart via pulmonary vein where muscles pump blood to the body via aorta</li> <li>oxygen carried by specialised cells / RBCs which contain haemoglobin to bind oxygen and have no nucleus so there is more space available to carry oxygen</li> <li>arteries carry oxygenated blood to tissues where capillaries deliver oxygen to cells for respiration and energy release</li> <li>thin walls allow for easy diffusion to cells</li> <li>large surface area of capillaries to maximise exchange</li> <li>waste products removed eg CO<sub>2</sub> diffuse from cells into the blood plasma</li> <li>blood goes back to the heart in veins which have valves to prevent backflow</li> <li>cardiac output can vary according to demand / is affected by adrenaline</li> </ul> <p>accept annotated diagrams</p> |                   |          |                                                   |
| <b>Total</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                   | <b>6</b> |                                                   |

**Question 11**

| Question     | Answers                                                                                                                                                                                                                                                                                                                                                                                                               | Extra information | Mark                                         | AO / Spec. Ref.   |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------|-------------------|
| 11.1         | A                                                                                                                                                                                                                                                                                                                                                                                                                     |                   | 1                                            | AO3/1a<br>4.3.2.2 |
| 11.2         | any <b>one</b> from: <ul style="list-style-type: none"> <li>identify / locate specific molecules / other hormones</li> <li>locate blood clots</li> <li>diagnose / treat some cancers</li> </ul>                                                                                                                                                                                                                       |                   | 1                                            | AO1/1<br>4.3.2.2  |
| 11.3         | <p>(as) urine passes through reaction zone</p> <p>HCG hormone binds to the mobile HCG antibody (in the reaction zone)</p> <p>(passes up the stick) HCG hormone binds to the immobilised HCG antibodies in the results zone</p> <p>(the other) antibodies which do not attach to HCG</p> <p>bind to antibodies in control zone</p> <p>blue dye appears in both control and results zones (to show positive result)</p> |                   | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | AO2/1<br>4.3.2.2  |
| <b>Total</b> |                                                                                                                                                                                                                                                                                                                                                                                                                       |                   | <b>8</b>                                     |                   |



