

# GCSE BIOLOGY 8461/1H

Paper 1 Higher Tier

Mark scheme

June 2020

Version: 1.0 Final



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 Examiner.

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.

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## 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
- the Assessment Objectives, level of demand 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. Emboldening 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 emboldened. 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<br>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, | 0             |
|         | Moon                |               |

## 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 Allow

In the mark scheme additional information, 'allow' is used to indicate creditworthy alternative answers.

## 3.9 Ignore

Ignore is 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.

#### 3.10 Do not accept

Do **not** accept 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.

# 4. Level of response marking instructions

Extended response questions are marked on level of response mark schemes.

- 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 two 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.

When assigning a level you should look at the overall quality of the answer. Do **not** look to penalise 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.

Use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 2 with a small amount of level 3 material it would be placed in level 2 but be awarded a mark near the top of the level because of the level 3 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 | Answers  | Extra information  | Mark | AO /<br>Spec. Ref.        |
|----------|--|--|------|---------------------------|
| 01.1     |  | allow correct chemical symbols ignore any attempt at balancing equation ignore light / chlorophyll |      | AO1<br>4.4.1.1            |
|          | before arrow carbon dioxide <b>and</b> water                           | either order   | 1    |                           |
|          | after arrow<br>glucose   | ignore sugar / carbohydrate<br>do <b>not</b> accept starch   | 1    |                           |
| 01.2     | <u>light</u>   | ignore description of subsequent parts of the photosynthesis reaction allow sunlight ignore sun    | 1    | AO1<br>4.1.1.2<br>4.4.1.1 |
|          | (light) is captured / trapped / absorbed by chlorophyll / chloroplasts | allow (light) is used by chlorophyll / chloroplasts  | 1    |                           |
| 01.3     | $\frac{18.5 + 19.3 + 19.5}{3}$ or $\frac{57.3}{3}$                     |  | 1    | AO2<br>4.4.1.2<br>RPA 6   |
|          | 19.1 (cm <sup>3</sup> /hour)   | allow an answer correctly calculated using only two correct values                                 | 1    |                           |
| 01.4     | a ring around 14.2   | allow clear indication of correct result   | 1    | AO3<br>4.4.1.2<br>RPA 6   |

| 01.5 | any one from:  • scale / value was misread  • there was air / oxygen in the syringe / measuring cylinder / apparatus  • the lamp / light was moved  • temperature changed  • had different mass / length of pondweed  • pondweed had not acclimatised | ignore human error ignore references to counting bubbles or time allow measurement error  allow light intensity changed ignore different bulb / lamp unqualified | 1 | AO3<br>4.4.1.2<br>RPA 6 |
|------|---|--|---|-------------------------|
| 01.6 | did not use it in calculation (of mean)   |  | 1 | AO3<br>4.4.1.2<br>RPA 6 |
| 01.7 | <ul> <li>any one from:</li> <li>light (intensity)</li> <li>carbon dioxide<br/>(concentration)</li> <li>pondweed size / amount</li> <li>pondweed species</li> </ul>  | do <b>not</b> accept temperature ignore time allow distance / power / colour of lamp / light   | 1 | AO3<br>4.4.1.2<br>RPA 6 |
| 01.8 | enzyme(s) lose the shape of the active site   | allow enzyme(s) (start to) denature allow enzyme(s) destroyed / damaged do <b>not</b> accept enzyme(s) killed  | 1 | AO2<br>4.2.2.1          |

| 01.9  | y-axis labelled '(rate of)<br>photosynthesis in cm³/hour' |   | 1  | AO2<br>4.4.1.2<br>RPA 6 |
|-------|---|---|----|-------------------------|
|       | suitable scale on y-axis                                  | must take up half or more of grid provided  | 1  |                         |
|       | all points plotted to within ± ½ small square             | allow 3 or 4 correct plots for 1 mark ignore any attempt to plot a point at 20 °C | 2  |                         |
|       | correct curved line of best fit                           | ignore line joined point to point<br>with straight lines<br>ignore extrapolation  | 1  |                         |
| Total |   |   | 16 |                         |

| Question | Answers  | Extra information  | Mark | AO /<br>Spec. Ref.        |
|----------|--|--|------|---------------------------|
| 02.1     | movement / spreading out of molecules / particles        | allow movement / spreading out<br>of (named) substances /<br>chemicals / gases / liquids | 1    | AO1<br>4.1.3.1            |
|          |  | ignore reference to membranes / cells  |      |                           |
|          | from (an area of) high(er) concentration to (an area of) | allow down / with the concentration gradient   | 1    |                           |
|          | low(er) concentration                                    | ignore along / across the concentration gradient   |      |                           |
|          |  | do <b>not</b> accept movement from / to a concentration gradient                         |      |                           |
| 02.2     | increased carbon dioxide concentration in the air        |  | 1    | AO2<br>4.1.3.1<br>4.2.3.2 |
|          | increased number of stomata that are open                |  | 1    |                           |

| 02.3 | Level 3: Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.   | 5–6 | AO1<br>4.1.3.1<br>4.2.2.2 |
|------|---|-----|---------------------------|
|      | <b>Level 2:</b> Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.   | 3–4 | 4.2.2.3                   |
|      | <b>Level 1:</b> Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.   | 1–2 |                           |
|      | No relevant content   | 0   |                           |
|      | Indicative content  |     |                           |
|      | (many) alveoli  |     |                           |
|      | <ul> <li>provide a large(r) surface area (: volume)</li> </ul>  |     |                           |
|      | <ul> <li>capillaries are thin         or alveoli / capillary walls are thin or one cell thick         or capillaries are close to the alveoli         which provides short diffusion path (for oxygen / carbon dioxide)</li> </ul>  |     |                           |
|      | <ul> <li>breathing (mechanism) moves air in and out         or lungs are ventilated         <ul> <li>to bring in (fresh) oxygen</li> <li>to remove carbon dioxide</li> <li>to maintain a concentration / diffusion gradient</li> </ul> </li> <li>large capillary network (around alveoli)         or good blood supply         <ul> <li>to remove oxygen(ated blood) quickly</li> <li>to bring carbon dioxide to the lungs quickly</li> <li>to maintain a concentration / diffusion gradient</li> </ul> </li> </ul> |     |                           |

| 02.4  | osmosis   | allow diffusion   | 1  | AO1<br>4.1.3.1<br>4.2.3.2<br>4.1.3.2 |
|-------|---|---|----|--------------------------------------|
| 02.5  | active transport  |   | 1  | AO3                                  |
|       | (because) energy is needed  |   | 1  | AO2                                  |
|       | (to move nitrate ions) from a low(er) concentration (in the soil) to a high(er) concentration | allow (to move nitrate ions) against / up the concentration gradient  | 1  | AO2<br>4.1.1.3                       |
|       | (in the root / cell)  | allow (because) there is a lower concentration (of nitrate ions) in the soil <b>or</b> (because) there is a higher concentration (of nitrate ions) in the root / cell |    | 4.2.3.2<br>4.1.3.3                   |
|       |   | ignore reference to amount / number of nitrate ions   |    |                                      |
|       |   | ignore along / across the concentration gradient  |    |                                      |
|       |   | do <b>not</b> accept if reference to molecules / atoms moving   |    |                                      |
| Total |   |   | 14 |                                      |

| Question | Answers   | Extra information  | Mark | AO /<br>Spec. Ref.                   |
|----------|---|--|------|--------------------------------------|
| 03.1     | any <b>two</b> from: (both have) • cytoplasm • (cell) membrane • DNA / genetic material   | ignore reference to shape  allow RNA ignore genetic information  | 2    | AO2<br>4.1.1.1<br>4.1.1.2<br>4.1.2.1 |
|          | • ribosomes   | if no other mark awarded allow sub-cellular structures for 1 mark if no other mark awarded allow correct cellular process, e.g. respiration for 1 mark |      |                                      |
| 03.2     | any three from:   | allow converse for eukaryotic cells allow reference to bacterium instead of prokaryotic cell ignore reference to features not shown in Figure 5        | 3    | AO2<br>4.1.1.1<br>4.1.1.2<br>4.1.2.1 |
|          | <ul> <li>prokaryotic cell is smaller</li> <li>prokaryotic cell has no mitochondria</li> <li>prokaryotic cell has no nucleus</li> <li>or DNA is free in the cytoplasm</li> <li>or genetic material is free in the cytoplasm</li> </ul> | if neither mark awarded, allow<br>prokaryotic cell has no<br>membrane-bound organelles<br>ignore genetic information                                   |      |                                      |
|          | prokaryotic cell has a single<br>loop of DNA     or prokaryotic cell has a<br>single loop of genetic material   | ignore genetic information   |      |                                      |
|          | prokaryotic cell has plasmids   | ignore circular / rings of DNA<br>allow prokaryotic cells have<br>smaller ribosomes  |      |                                      |

| 03.3  | 1 μm = 0.001 mm<br>or 1 mm = 1000 μm<br>or 0.05 mm = 50 μm<br>or 0.05 × 1000   |  | 1  | AO2<br>4.1.1.1<br>4.1.1.2 |
|-------|--|--|----|---------------------------|
|       | (1:) 50  | do <b>not</b> accept if a unit is given  | 1  |                           |
| 03.4  | mitosis  | correct spelling only  | 1  | AO1<br>4.1.2.2            |
| 03.5  | 35%  |  | 1  | AO2<br>4.1.2.2            |
| 03.6  | (stage 1) DNA / chromosomes replicate / duplicate  | ignore names of the stages of<br>the cell cycle<br>ignore genetic material<br>ignore DNA / chromosomes<br>double / reproduce | 1  | AO1<br>4.1.2.2            |
|       | mitochondria / ribosomes / sub-<br>cellular structures increase in<br>number<br>or mitochondria / ribosomes /<br>sub-cellular structures replicate | allow cytoplasm increases ignore cell grows unqualified  | 1  |                           |
|       | (stage 2) one set of chromosomes is pulled / moved to each end of the cell   | allow one of each chromosome<br>is pulled / moved to each end of<br>the cell<br>ignore nucleus divides                       | 1  |                           |
|       | (stage 3) the cytoplasm <b>and</b> cell membrane divides (to form two cells)   | allow cytoplasm divides <b>and</b> (new) cell membranes form ignore nucleus divides  | 1  |                           |
| Total |  |  | 13 |                           |

| Question | Answers   | Extra information  | Mark | AO /<br>Spec. Ref. |
|----------|---|--|------|--------------------|
| 04.1     | fatty acids   |  | 1    | AO1<br>4.2.2.1     |
|          | glycerol  |  | 1    | 4.4.2.3            |
| 04.2     | enzyme binds to the substrate<br>because they are<br>complementary (shapes)                           | allow enzyme joins to the substrate because they fit together exactly              | 1    | AO2<br>4.2.2.1     |
|          |   | allow enzyme joins to the substrate because the substrate fits the active site     |      |                    |
|          |   | ignore reference to specificity do <b>not</b> accept same shape                    |      |                    |
|          | (so) substrate is broken down (into products)   | allow (so) substrate splits (into products)  | 1    |                    |
|          |   | ignore products are formed, unqualified  |      |                    |
|          | (so) products are released <b>or</b> enzyme is not changed  | allow enzyme is not used up  | 1    |                    |
|          |   | allow reference to activation energy for either marking point 2 or marking point 3 |      |                    |
| 04.3     | each <u>active site</u> has a specific shape (so only fits one type of                                | allow each <u>active site</u> is a different shape                                 | 1    | AO2<br>4.2.2.1     |
|          | lipid molecule)   | do <b>not</b> accept reference to the substrate having an active site              |      |                    |
| 04.4     | add Benedict's (solution / reagent to the liquid)   |  | 1    | AO1<br>4.2.2.1     |
|          | boil / heat   | allow any temperature of 65 °C or above  | 1    | RPA 4              |
|          | (if glucose is present the blue)<br>colour changes to yellow / green<br>/ orange / brown / (brick)red |  | 1    |                    |

| 04.5  | add iodine solution / reagent (to<br>the liquid)  (if starch is present) it changes<br>colour to blue / black (from<br>yellow / orange / brown)   | allow add a drop of iodine ignore iodine unqualified   | 1  | AO1<br>4.2.2.1<br>RPA 4              |
|-------|---|--|----|--------------------------------------|
| 04.6  | glucose from photosynthesis   | do <b>not</b> accept starch made in photosynthesis   | 1  | AO2<br>4.2.2.1<br>4.4.1.1            |
|       | (excess) glucose converted to starch  | allow (excess) glucose is stored as starch   | 1  | 4.4.1.3<br>4.4.2.3                   |
| 04.7  | starch (stores) have been converted to glucose  | ignore reference to residual glucose from previous photosynthesis                                  | 1  | AO3<br>4.4.1.1<br>4.4.2.1<br>4.4.1.3 |
|       | (so the glucose can be) used for respiration / (named) metabolic reactions  or (so the glucose can be) used to release energy   | do <b>not</b> accept idea of energy<br>being produced / created / made                             | 1  | 7.7.1.0                              |
|       | (because) there is no light to<br>make (new / more) glucose by<br>photosynthesis  |  | 1  |                                      |
| 04.8  | any <b>one</b> from:  • test roots / stems of plants (in  | do <b>not</b> accept reference to changing the independent variable  allow test other parts of the | 1  | AO3<br>4.4.1.2<br>4.4.1.3            |
|       | <ul> <li>the light and dark)</li> <li>test other species of plant</li> <li>measure the concentrations of glucose and starch</li> <li>vary the time in the dark / light</li> <li>test variegated leaves</li> </ul> | allow test other types of plant ignore mass / amount   |    |                                      |
|       |   | allow any other valid extension ignore repeats   |    |                                      |
| Total |   |  | 17 |                                      |

| Question | Answers  | Extra information  | Mark | AO /<br>Spec. Ref. |
|----------|--|--|------|--------------------|
| 05.1     | mechanical   | allow physical allow structural  | 1    | AO3<br>4.3.3.2     |
| 05.2     | <ul><li>any <b>one</b> from:</li><li>to deter herbivores</li></ul> | ignore to injure animals, unqualified allow to deter animals eating it do <b>not</b> accept to deter predators | 1    | AO2<br>4.3.3.2     |
|          | to prevent animals damaging it                                     |  |      |                    |
| 05.3     | chemical   |  | 1    | AO3<br>4.3.3.2     |

| 05.4 | any two from:  • lack of magnesium (ions) (1)  (so) not enough chlorophyll for (efficient) photosynthesis (1)  (so) not enough glucose to make proteins for growth or not enough glucose to release energy for growth (1) | allow (so) lack of chlorophyll produced causes yellow leaves (1), (so) not enough photosynthesis to produce glucose which is used to make proteins for growth (1) | 5 | AO2<br>4.3.3.1<br>4.3.1.1<br>4.3.1.2<br>4.3.1.4<br>4.4.1.1<br>4.4.1.2<br>AO1<br>4.4.2.3<br>4.4.1.3 |
|------|---|---|---|--|
|      | <ul> <li>infection by pathogen /<br/>bacteria / virus / fungus (1)</li> </ul>   | allow correctly named pathogen allow has rose black spot / TMV  |   |  |
|      | (so) leaves become discoloured / yellow so less photosynthesis (1)  | allow other symptoms of named pathogens / disease   |   |  |
|      | (so) not enough glucose to<br>make proteins for growth<br>or not enough glucose to<br>release energy for growth (1)   | award once only   |   |  |
|      | <ul> <li>infected by aphids (1)</li> <li>(which) remove sugars from phloem (1)</li> </ul>   |   |   |  |
|      | (so) not enough glucose to<br>make proteins for growth<br>or not enough glucose to<br>release energy for growth (1)   | award once only   |   |  |
|      | <ul> <li>lack of (available) light (1)</li> <li>(so) chlorophyll breaks down (1)</li> </ul>   |   |   |  |
|      | (so) not enough glucose to make proteins for growth <b>or</b> not enough glucose to release energy for growth (1)   | award once only   |   |  |

| 05.5  | (bacteria) obtain glucose / sugar (from the plant)          |  | 1  | AO3                       |
|-------|---|--|----|---------------------------|
|       | (glucose used) for respiration or (glucose used) for making | allow (glucose used) to release energy | 1  | AO2                       |
|       | other named substances                                      |  |    | 4.2.3.2<br>4.4.1.3        |
| 05.6  | (gorse plant) obtains nitrate (ions)                        |  | 1  | AO2<br>4.1.3.3<br>4.4.2.3 |
|       | needed for amino acids / proteins                           | allow needed to make chlorophyll / DNA | 1  | AO1<br>4.3.3.1            |
| 05.7  | willow bark   |  | 1  | AO2<br>4.3.1.9            |
| Total |   |  | 13 |                           |

| Question | Answers   | Extra information  | Mark | AO /<br>Spec. Ref. |
|----------|---|--|------|--------------------|
| 06.1     | any <b>two</b> from:  | ignore genetic factors   | 2    | AO3<br>4.2.2.6     |
|          | <ul><li>BMI / morphology / obesity level</li><li>smoking habits</li></ul>   | allow mass / weight <b>and</b> height  |      |                    |
|          | <ul><li>diet</li><li>medication</li></ul>   | allow previous drinking habits allow medical conditions allow drug use                             |      |                    |
|          | <ul> <li>family history of liver disease</li> <li>fitness levels</li> <li>ethnicity</li> <li>area of UK they live in</li> </ul> | allow level of exercise allow race   |      |                    |
| 06.2     | 2.55 – 1.60 (= 0.95)  | allow $1.60 - 2.55$ (= $-0.95$ )<br>allow value for with meals in<br>range 1.60 to 1.65 (for 1.60) | 1    | AO2<br>4.2.2.6     |
|          | $(\frac{0.95}{2.55} \times 100 = )$ 37 (.2549019608) (%)  | allow answer correctly calculated from values in ranges 1.60 to 1.65 and 2.50 to 2.60              | 1    |                    |
|          |   | allow – 37(.2549019608)(%)   |      |                    |
| 06.3     | $12 \times 2 \times 7 = 168 \text{ (g/week)}$   |  | 1    | AO2<br>4.2.2.6     |
|          | 1.8   | allow in range 1.8-1.9   | 1    |                    |
|          |   | allow correct reading from a calculation that omits the 2 <b>or</b> the 7                          |      |                    |
|          |   | do <b>not</b> accept if a unit is given  |      |                    |

| 06.4 | <ul> <li>any two from:</li> <li>consuming alcohol increases the RR (with / without meals) and supporting data</li> <li>consuming less than 50 g/week of alcohol with meals does not increase the RR</li> <li>even (small amounts of alcohol at) 25 g/week increases the RR if not with meals</li> </ul> | allow risk for RR throughout allow data in terms of number of glasses of wine  allow increasing alcohol consumption increases the RR at an increasing rate  allow any value between 35 and 60 g/week | 2 | AO3<br>4.2.2.6 |
|------|---|--|---|----------------|
| 06.5 | <ul> <li>any two from:</li> <li>large number in survey</li> <li>long term / 15 year survey</li> <li>well controlled</li> </ul>  | allow 800 000 in survey if neither mark awarded allow large study allow many controls  | 2 | AO3<br>4.2.2.6 |
| 06.6 | <ul> <li>any one from:</li> <li>people underestimate / overestimate alcohol consumption</li> <li>people may change (lifestyle / drinking) habits over time</li> <li>some people may drink all their weekly alcohol at once</li> </ul>   | allow people lie about alcohol consumption or people lie about other named control variables  ignore survey only tested women  | 1 | AO3<br>4.2.2.6 |

15

| 06.7 | Level 2: Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.   | 3-4 | AO2<br>4.4.2.3<br>4.2.2.1 |
|------|---|-----|---------------------------|
|      | <b>Level 1:</b> Facts, events or processes are identified and simply stated but their relevance is not clear.   | 1-2 | AO1<br>4.4.2.2<br>4.2.2.6 |
|      | No relevant content   | 0   | 4.2.2.5<br>4.5.3.3        |
|      | Indicative content  |     | 4.5.5.5                   |
|      | Responses may refer to either total or partial liver failure  |     |                           |
|      | <ul> <li>no bile made (in the liver)</li> <li>fats / lipids are not emulsified</li> <li>surface area of fats / lipids not increased</li> <li>pH of small intestine will not be alkaline / neutralised</li> <li>enzymes (in small intestine) will not work effectively</li> <li>or (named) food not digested / absorbed</li> <li>so may lose weight</li> </ul> |     |                           |
|      | <ul> <li>lactic acid not broken down / oxidised</li> <li>accumulation of lactic acid in blood / body</li> <li>lactic acid is toxic or body will be poisoned</li> <li>oxygen debt higher / prolonged</li> <li>so muscle pain / fatigue</li> </ul>  |     |                           |
|      | <ul> <li>proteins / amino acids will not be broken down (in liver)</li> <li>(amino acids) not deaminated</li> <li>amino acids not made into urea or will not form ammonia</li> <li>(however) any ammonia formed is toxic</li> <li>so accumulation of amino acids in blood / body</li> </ul>   |     |                           |
|      | <ul> <li>liver does not break down / remove other toxins (like alcohol)</li> <li>toxins accumulate in blood / body</li> <li>body will be poisoned</li> <li>so pain or jaundice or swollen liver or portal hypertension occurs</li> </ul>  |     |                           |
|      | glycogen stores will not be formed     cannot control blood glucose     so hyperglycaemia / hypoglycaemia / diabetes / coma     may occur   |     |                           |
| v    |   |     |                           |

| _ | - |
|---|---|
| / | / |

Total

| Question | Answers   | Extra information   | Mark | AO /<br>Spec.Ref.                    |
|----------|---|---|------|--------------------------------------|
| 07.1     |   | ignore add mAbs and dye to slide (unbound)  |      | AO2<br>4.3.2.2                       |
|          | bind fluorescent dye to mAbs  |   | 1    |                                      |
|          | put (bound) fluorescent mAbs on the slide (and rinse off)                                     |   | 1    |                                      |
|          | mAbs will bind to Candida albicans / pathogens and show up under the microscope               | allow mAbs will bind to Candida albicans / pathogens and show up under UV (lamp)                            | 1    |                                      |
| 07.2     | more Candida albicans / pathogens will be engulfed / killed by phagocytes / white blood cells | allow Candida albicans / pathogens will be engulfed / killed by phagocytes / white blood cells more quickly | 1    | AO2<br>4.2.2.3<br>4.3.1.6<br>4.3.1.7 |
|          |   | do <b>not</b> accept white blood cells produce antibodies   |      |                                      |
|          |   | do <b>not</b> accept lymphocytes engulf Candida albicans  |      |                                      |
|          | therefore less damage to cells / tissues / organs   | ignore less toxin released (by Candida albicans)  | 1    |                                      |

| 07.3  | Level 2: Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.   | 4-6 | AO1<br>4.3.1.9                       |
|-------|---|-----|--------------------------------------|
|       | Level 1: Facts, events or processes are identified and simply stated but their relevance is not clear.  |     |                                      |
|       | No relevant content   | 0   |                                      |
|       | Indicative content  |     |                                      |
|       | <ul> <li>given first to healthy volunteers</li> <li>at (very) low dose</li> <li>to test it is safe or to test for toxicity or to check for any side effects</li> </ul>  |     |                                      |
|       | then to some patients (with the disease) or people with the disease  to test for the correct / optimum dose to check for any side effects to test for efficacy or to test if it works in a double blind trial where neither patients nor doctors know who has the mAbs and who has a placebo (or alternative treatment) |     |                                      |
| 07.4  | reference to large trial <b>or</b> long duration <b>or</b> control variables  | 4   | 400                                  |
| 07.4  | any one from:  • (the body will) not reject the mAbs or (the body is) less likely to reject the mAbs  | 1   | AO3<br>4.3.2.2<br>4.3.2.1<br>4.3.1.6 |
|       | mouse mAbs are (more likely to be) rejected   |     |                                      |
|       | the human lymphocytes     have already responded to     that infection / cancer cell so     they are known to work     against the disease  |     |                                      |
| Total |   | 12  |                                      |