



# Mark Scheme (Results)

Summer 2022

Pearson Edexcel International GCSE  
In Human Biology (4HB1) Paper 01R

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## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

| Question number | Answer  | Notes   | Marks |
|-----------------|---|---|-------|
| 1 (a) (i)       | X = cell membrane;<br>Y = nucleus;<br><br>Z = cytoplasm;  | Allow nuclear membrane                                  | 3     |
| (ii)            | mitochondria/ribosomes/endoplasmic reticulum  |   | 1     |
| (iii)           | <ul style="list-style-type: none"> <li>• similar cells work together to form tissues;</li> <li>• (different) tissues work together to form organs;</li> </ul> |   | 2     |
| (b)             |   | Reject more than one line from each process             | 3     |
| (c) (i)         | A = squamous (epithelium)<br>B = ciliated (epithelium)  |   | 2     |
| (ii)            | 60 x 40;<br>2400 (µm) (÷1000);<br>2.4 (mm);   | Ecf from mp1. Max 2 marks e.g. 60 ÷ 40 (÷1000) = 0.0015 | 3     |

Total 14 marks

| Question number | Answer   | Notes                          | Marks |
|-----------------|--|--------------------------------|-------|
| 2 (a) (i)       | W large intestine;<br>X oesophagus;<br>Y stomach;<br>Z small intestine;  | Allow colon<br><br>Allow ileum | 4     |
| (ii)            | In the following order only: <ul style="list-style-type: none"> <li>• bolus;</li> <li>• muscles;</li> <li>• contract;</li> <li>• peristalsis;</li> </ul>   |                                | 4     |
| (b) (i)         | salivary gland/ pancreas;  |                                | 1     |
| (ii)            | (lining of) <b>small</b> intestine/ ileum/ duodenum;   |                                | 1     |
| (iii)           | <ul style="list-style-type: none"> <li>• starch digested/broken down to sugar/glucose;</li> <li>• (sugar) diffuses/moves out through (Visking tubing);</li> </ul>                                  | Allow maltose                  | 2     |
| (iv)            | Benedict's solution/reagent;   |                                | 1     |
| (v)             | Any two from the following: <ul style="list-style-type: none"> <li>• blue/black colour;</li> <li>• (undigested) starch is present;</li> <li>• too large to pass through Visking tubing;</li> </ul> |                                | 2     |

**Total marks 15**

| Question number | Answer   | Notes  | Marks |
|-----------------|--|--|-------|
| 3 (a)           | (i) 3 320 000;   |  | 1     |
|                 | (ii) 6.00239;<br>x 10 <sup>5</sup> ;   | Allow 6.0024   | 2     |
|                 | (iii) pancreas;  |  | 1     |
| (b)             | (i) $120 \div 1.95^2 / 3.8029$ ;<br>31.6;  | Allow figure not rounded - 31.5581<br>Allow 31.56/32                             | 2     |
|                 | (ii) obese;  | ecf from previous question   | 1     |
| (c)             | (i) <ul style="list-style-type: none"> <li>as BMI increases the risk of diabetes increases;</li> <li>between a BMI of 24-35 the risk of diabetes increases more rapidly/BMI less than 25 the risk increases less rapidly;</li> </ul> | Allow any range values between 24-35   | 2     |
|                 | (ii) Any two from the following: <ul style="list-style-type: none"> <li>balanced diet;</li> <li>eat less fat;</li> <li>eat less sugar</li> </ul>   | Ignore healthy diet<br><br>Allow reduce alcohol/carbohydrate consumption for mp3 | 2     |

**Total marks 11**

| Question number | Answer   | Notes  | Marks |
|-----------------|--|--|-------|
| 4 (a)           | (i) Any three of the following: <ul style="list-style-type: none"> <li>• add alcohol/ethanol to food;</li> <li>• shake;</li> <li>• add water;</li> <li>• milky coloration shows fat present;</li> </ul>  | Allow rub food; onto filter paper; translucent; answer must be in sequence i.e. ethanol first  | 3     |
|                 | (ii) lipase  |  | 1     |
|                 | (iii) fatty acids; glycerol;   |  | 2     |
| (b)             | (i) Any value between 8.6 and 8.8;   |  | 1     |
|                 | (ii) independent = time/ temperature;<br>dependent = pH;   |  | 2     |
|                 | (iii) <ul style="list-style-type: none"> <li>• 37°C is the optimum temperature;</li> <li>• lipase/enzyme is more active/works faster;</li> <li>• fat is digested more quickly;</li> <li>• at 80 °C/higher temperature enzyme becomes denatured;</li> </ul> | Allow reverse argument throughout: <ul style="list-style-type: none"> <li>• at 80°C/higher temperature enzyme is denatured;</li> <li>• enzyme less active;</li> <li>• fat digested more slowly;</li> <li>• 37°C is the optimum temperature (for enzyme activity/enzyme works faster at 37°C</li> </ul> | 4     |

**Total marks 13**

| Question number | Answer  | Notes   | Marks |
|-----------------|---|---|-------|
| 5               | <p>Any five from the following:</p> <ul style="list-style-type: none"> <li>sterilisation is the most effective/condom less effective;</li> <li>(with sterilisation) surgery carries risk (of infection/complications);</li> <li>sterilisation cannot be reversed/permanent;</li> <li>condom protects against sexually transmitted disease;</li> <li>(condoms) can only be used once;</li> </ul> | <ul style="list-style-type: none"> <li>Allow for mp1 less risk of pregnancy with sterilisation/more risk of pregnancy using condoms;</li> </ul> | 5     |

**Total marks 5**

| Question number | Answer   | Notes  | Marks |
|-----------------|--|--|-------|
| 6               | <p>Any seven from the following:</p> <ul style="list-style-type: none"> <li>cornea refracts light;</li> <li>ciliary muscles contract/relax;</li> <li>to change the shape of the lens;</li> <li>(the lens) refracts light;</li> <li>retina contains receptor/rod/cone cells;</li> <li>(retina) converts light into electrical/nerve impulses;</li> <li>optic nerve contains sensory neurones;</li> <li>optic/sensory neurones carry impulses to the brain;</li> </ul> | <p>Allow signals as an alternative to impulses throughout</p> <p>Ignore shorten/widen lens</p> | 7     |

**Total marks 7**



| Question number | Answer  | Notes   | Marks |
|-----------------|---|---|-------|
| 7 a)            | bacteria;   |   | 1     |
| (b)             | <ul style="list-style-type: none"> <li>• through water/food;</li> <li>• containing contaminated/infected faeces;</li> </ul>   | Do not need to say contaminated for mp2 if mentioned in mp1 | 2     |
| (c)             | <p>Any four from the following:</p> <ul style="list-style-type: none"> <li>• oral rehydration therapy;</li> <li>• replacement of fluids/salts/sugar;</li> <li>• as water/salts are lost through vomiting / diarrhoea;</li> <li>• antibiotics;</li> <li>• to kill bacteria;</li> </ul> |   | 4     |

**Total marks 7**

| Question number | Answer   | Notes | Marks |
|-----------------|--|-------|-------|
| 8               | <p>Any five from the following:</p> <p><b>Kidney transplants - advantages</b></p> <ul style="list-style-type: none"> <li>• patient can lead a normal life;</li> <li>• less cost (overall) to patient/health service;</li> <li>• no need to monitor diet;</li> </ul> <p><b>Kidney transplants - disadvantages</b></p> <ul style="list-style-type: none"> <li>• shortage of organ donors;</li> <li>• requires surgery with the risk of infection;</li> <li>• chance of rejection;</li> <li>• patient must take (immune-suppressant) medication for life;</li> </ul> <p><b>Dialysis - advantages</b></p> <ul style="list-style-type: none"> <li>• prolongs life temporarily/temporary solution;</li> <li>• no need for (immune-suppressant) medication;</li> <li>• available to all patients;</li> </ul> <p><b>Dialysis - disadvantages</b></p> <ul style="list-style-type: none"> <li>• regular visits (to hospital) for dialysis/long time spent on dialysis machine/need frequent treatment;</li> <li>• diet needs to be monitored;</li> <li>• less cost effective (justified);</li> </ul> |       | 5     |

Total marks 5

| Question number | Answer   | Notes | Marks |
|-----------------|--|-------|-------|
| 9 (a)           | <ul style="list-style-type: none"> <li>two groups of people;</li> <li>provide one group with statins and the other without;</li> <li>measure/compare levels of cholesterol / results after a period of time;</li> </ul>  |       | 3     |
| (b)             | <p>Any four from the following:</p> <ul style="list-style-type: none"> <li>catheter inserted (into affected area);</li> <li>balloon/stent inflated/expanded;</li> <li>stent expands;</li> <li>blood vessel opened/diameter of vessel increased;</li> <li>blood flows more freely;</li> <li>more oxygen to muscle (tissue);</li> <li>more aerobic respiration;</li> </ul> |       | 4     |

**Total marks 7**

| Question number | Answer   | Notes | Marks |
|-----------------|--|-------|-------|
| 10 (a)          | <p>Any three from the following:</p> <ul style="list-style-type: none"> <li>bones break more easily;</li> <li>loss of height over time;</li> <li>poor posture/difficulty walking/exercising;</li> <li>(back) pain;</li> </ul>  |       | 3     |
| (b)             | <p>Any three from the following:</p> <ul style="list-style-type: none"> <li>muscles attached to bones;</li> <li>(muscles) work antagonistically;</li> <li>When one muscle contracts the other relaxes;</li> <li>bone is pulled (to bring about movement);</li> </ul> |       | 3     |

**Total marks 6**

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