## B5 Summary questions

<table>
<thead>
<tr>
<th>Question number</th>
<th>Answer</th>
<th>Marks</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GCSE Biology only</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1 | Any six from:  
- make culture of floor bacteria or standard bacterial culture  
- add circles of filter paper soaked in different concentrations of disinfectant  
- seal, turn upside down  
- measure diameter of circles of clear jelly (zone of inhibition)  
- calculate area of clear circles as measure of effectiveness of different concentrations of disinfectant  
- health and safety considerations:  
  - bacterial culture could grow dangerous pathogens  
  - incubate culture at no more than 25 °C  
  - do not open sealed Petri dishes | 6 | Credit other sensible suggestions. |
| 2 a | fridge temperature: cooler  
all enzyme-controlled reactions in bacteria are slowed down so they cannot divide so quickly  
room temperature: nearer optimum temperature for enzymes | 1 |  |
| 2 b i | bacteria divide every hour, so 24 times in 24 hours  
\[1 \times 2^{24} = 16,777,216\] | 1 |  |
| 2 b ii | bacteria divide every 6 hours, so 4 times in 24 hours  
\[1 \times 2^{4} = 32\] | 1 |  |
# B5 Summary questions

## 2 c
\[
\frac{16777184}{16777216} \times 100 = 99.9\% \text{ more bacteria formed at room temperature}
\]

## 2 d
- **Pros:** would kill bacteria
- **Cons:** would boil water in strawberries
denature enzymes
killing cells and turning strawberries to mush

## 3 a
HIV is virus that causes disease AIDS

## 3 b i
\[
\frac{35000000}{100} \times 70 = 24,500,000 \text{ people living with HIV in sub-Saharan Africa}
\]
\[
\frac{1500000}{100} \times 70 = 1,050,000 \text{ deaths from AIDS in sub-Saharan Africa}
\]

## 3 b ii
numbers of people affected by HIV and dying from AIDS not known precisely
not all cases diagnosed
not all deaths properly accounted for

## 3 c i
\[
13.6/26 \times 100 = 52.3 \%
\]
52% of people on treatment

## 3 c ii
poor health care infrastructure
many HIV/AIDS sufferers live in poor countries that cannot afford drugs or system of health workers to administer drugs
### B5 Summary questions

| 3 d i | Any three from:  
|      | • use condoms when having sex  
|      | • avoid sharing needles  
|      | • limit number of sexual partners  
|      | • screen blood for transfusions  
|      | • HIV-positive mothers should not breastfeed | 3 |

| 3 d ii | condoms: prevent virus passing from one person to another  
|        | needles: reduce risk of getting virus from infected blood  
|        | limited partners: reduces chance of having sex with an infected person  
|        | blood screening: prevents infected blood being given to a healthy patient  
|        | no breastfeeding: avoids passing virus on in milk to baby | 6 |

Explanations must match methods given in 3 d i.  
Maximum 2 marks for each explanation.

| 4 a | award marks for well-drawn graph or chart correctly labelled | 5 |

| 4 b | cotton  
|     | as crop loss reduced by  
|     | $82.0 - 28.8 = 53.2\%$ | 1 |

| 4 c | wheat  
|     | as crop loss reduced by  
|     | $49.8 - 28.2 = 21.6\%$ | 1 |

| 4 d i | Accept any three plant diseases. | 3 |

| 4 d ii | Accept any appropriate effects on crop yield. | 6 |

Explanations must match diseases given in 4 d i.  
Maximum 2 marks for each explanation.
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<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
</table>
| 4 e | - good field hygiene  
    | - keeping plants well apart  
    | - controlling insect pests to prevent spread of pathogens  
    | - planting disease-resistant strains | 3 |

| 4 f | Crop protection measures can protect crop yields (particularly cotton, potatoes, rice, and maize).  
    | improved crop yields provide economic stability  
    | (reducing impact on human health of diseases associated with poverty)  
    | and reduce risk of food shortage and starvation  
    | (communicable diseases more dangerous and prevalent in starving populations)  
    | graph/chart demonstrates that research into plant disease prevention increases crop yields | 1  
    | 1  
    | 1  
    | 1  
    | 1  
    | 1 |