Questions

Q1.

(a) The diagrams show a bacterial cell, a plant cell and an animal cell.
Structure X is found in all three cells.

(i) Complete the sentence by putting a cross (X) in the box next to your answer.
Structure X is the

- A cell membrane
- B cell wall
- C cytoplasm
- D nucleus

(ii) Many bacteria have one or more flagella whereas most animal cells have no flagella.
State one other difference between a bacterial cell and an animal cell.

(b) Scientists use microscopes to magnify cells.
(i) Use words from the box to complete the sentences.

<table>
<thead>
<tr>
<th>focusing wheel</th>
<th>less</th>
<th>light</th>
<th>objective lens</th>
<th>more</th>
</tr>
</thead>
</table>

The magnification of a light microscope can be varied by changing the ..........................................

The electron microscope can magnify images .............................................................................. than the light microscope.

(ii) The diagram shows a sperm cell that has been magnified 100 000 times.
Calculate the actual length of the sperm cell.

length of sperm cell = ................................................................. mm

(iii) Explain why a human sperm cell contains more mitochondria than most other types of cell in the human body.

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Q2.

Bacteria are microscopic organisms.
(i) State a part of the light microscope that magnifies the bacteria.

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Photograph A was taken using a light microscope and photograph B was taken using an electron microscope.

(ii) Describe two advantages of using an electron microscope to view bacteria.

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(iii) Name one structure of the bacterial cell that can be seen in the image from the electron microscope.

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### Q1.

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Answer</th>
<th>Acceptable answers</th>
<th>Mark</th>
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</thead>
<tbody>
<tr>
<td>(a)(i)</td>
<td>A</td>
<td></td>
<td>(1)</td>
</tr>
</tbody>
</table>
| (a)(ii)         | Any one of the following points  
  - bacterial cells have a cell wall  
    (animal cells do not) (1)  
  - bacterial cells do not have a nucleus  
    (animal cells do) (1)  
  - bacterial cells have circular DNA / chromosomal DNA  
    (animal cells do not) (1) | bacterial cells have plasmids | (1)  |
| (b)(i)          | • objective lens (1)  
  • more (1)      |                    | (2)  |
| (b)(ii)         | calculation (1)  
  
  130  
  100 000  
  correct answer (1)  
  - 0.00130 / 1.3 x 10^-3 |                    | (2)  |
| (b)(iii)        | An explanation including two of the following points  
  - mitochondria are sites of respiration for energy (1)  
  - sperm requires a lot of energy (1)  
  - for movement / swimming / to move the flagellum (1) |                    | (2)  |
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<tr>
<td>(i)</td>
<td>objective lens / eye piece lens</td>
<td>lens</td>
<td>(1)</td>
</tr>
</tbody>
</table>
| (ii) | A description including two of the following:  
- Image has more clarity/is more clear (1)  
- More detail can be seen (1)  
- Larger image can be seen (1)  
Accept: more focussed  
Accept: named bacterial cell components  
Accept: idea of greater magnification | | (2) |
| (iii) | Any one of the following:  
- cell wall  
- flagellum  
Accept: cell membrane  Ignore: tail | | (1) |