Q1.(a) The diagram shows the structure of a bacterial cell.

(i) On the diagram use words from the box to label structures A, B and C.

| cell membrane | cell wall | chloroplast | cytoplasm | plasmid |

(ii) Give one difference between the structure of the bacterial cell and an animal cell.

....................................................................................................................... (1)

(iii) Name one structure that is found in a plant cell but is not found in a bacterial or an animal cell.

....................................................................................................................... (1)

(b) Cells can be specialised for a particular job.

The diagram shows the structure of a human sperm cell.
Describe how the long tail and the mitochondria help the sperm to do its job.

Long tail....................................................................................................................................................... 
....................................................................................................................................................................... 
....................................................................................................................................................................... 
Mitochondria.................................................................................................................................................... 
....................................................................................................................................................................... 
....................................................................................................................................................................... 
....................................................................................................................................................................... 

(4)
(Total 9 marks)
Q2. Figure 1 shows a human cheek cell viewed under a light microscope.

(a) Label the nucleus and cell membrane on Figure 1.

(b) Cheek cells are a type of body cell.

Body cells grow through cell division.

What is the name of this type of cell division?

Tick one box.

- Differentiation
- Mitosis
- Specialisation

(c) Ribosomes and mitochondria are not shown in Figure 1.

What type of microscope is needed to see ribosomes and mitochondria?

........................................................................................................................................

(d) What is the advantage of using the type of microscope you named in part (c)?
Tick one box.

Cheaper

Higher magnification

Lower resolution

(e) The cheek cell in Figure 2 is magnified 250 times.

The width of the cell is shown by the line D to E.

Calculate the width of the cheek cell in micrometres (µm).

Complete the following steps.

Measure the width of the cell using a ruler .......................................... mm

Use the equation to work out the real width of the cell in mm:

\[
\text{real size} = \frac{\text{image size}}{\text{magnification}}
\]

.......................................... mm

Convert mm to µm .......................................... µm

(f) A red blood cell is 8 µin diameter.

A bacterial cell is 40 times smaller.
Calculate the diameter of the bacterial cell.

Tick one box.

- 0.02 µm
- 0.2 µm
- 2.0 µm
- 20.0 µm

(1)
(Total 9 marks)
Q3. Students in a school investigated the effect of five different antibiotics, A, B, C, D and E, on one type of bacterium.

The students:
• grew the bacteria on agar jelly in a Petri dish
• soaked separate paper discs in each of the antibiotics
• put the paper discs onto the bacteria in the Petri dish
• put the Petri dish into an incubator.

The diagram shows what the Petri dish looked like after 3 days.

(a) (i) What is the maximum temperature the incubator should be set at in the school?

Draw a ring around your answer.

\[ 10°C \quad 25°C \quad 50°C \]

(ii) Draw a ring around the correct answer to complete the sentence.

The incubator should **not** be set at a higher temperature because the higher temperature might help the growth of pathogens.

\[ \text{pathogens.} \quad \text{toxins.} \quad \text{viruses.} \]

(1)
(b) Which antibiotic, A, B, C, D or E, would be best to treat a disease caused by this type of bacterium?

Write your answer in the box.

Give the reason for your answer.

...................................................................................................................................................
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(2)

(c) Antibiotics **cannot** be used to treat diseases caused by viruses.

Why?

Tick (✔) one box.

Viruses are not pathogens

There are too many different types of virus

Viruses live inside cells

(1)

(Total 5 marks)
Q4. The diagrams show four types of cell, A, B, C and D. Two of the cells are plant cells and two are animal cells.

(a) (i) Which two of the cells are plant cells?

Tick (✓) one box.

A and B

A and D

C and D

(ii) Give one reason for your answer.

.............................................................................................................
.............................................................................................................

(1)
(b) (i) Which cell, A, B, C or D, is adapted for swimming? 

(ii) Which cell, A, B, C or D, can produce glucose by photosynthesis? 

(c) Cells A, B, C and D all use oxygen.

For what process do cells use oxygen?

Draw a ring around one answer.

- osmosis
- photosynthesis
- respiration

(Total 5 marks)
Q5. The diagram shows a cell.

(a) (i) Use words from the box to name the structures labelled A and B.

<table>
<thead>
<tr>
<th>cell membrane</th>
<th>chloroplast</th>
<th>cytoplasm</th>
<th>nucleus</th>
</tr>
</thead>
<tbody>
<tr>
<td>A ..................</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B ..................</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(ii) The cell in the diagram is an animal cell. How can you tell it is an animal cell and not a plant cell? Give two reasons.

1 ...............................................................................................................
2 ...............................................................................................................

(b) Oxygen will diffuse into the cell in the diagram.
Why?

Use information from the diagram.

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(1)

(c) The cell shown in the diagram is usually found with similar cells.

Draw a ring around the correct answer to complete the sentence.

an organ.

Scientists call a group of similar cells

a system.

a tissue.

(1)

(Total 6 marks)
Q6. The diagram shows how a student transferred some sour milk from a bottle to a Petri dish of nutrient agar.

**List A** gives four actions carried out by the student.

- **1.** The student heated a wire loop in a flame
- **2.** He placed the wire loop on the bench to cool
- **3.** He removed a drop of sour milk from a bottle using the wire loop
- **4.** He raised the lid a little from a Petri dish of sterilised nutrient agar

**List B** gives five possible effects of these actions.

- **5.** He spread the sample of sour milk across the nutrient agar
- **6.** He replaced the lid and put the Petri dish in an incubator at 25°C for 2 days
Draw a straight line from each action in List A to its effect in List B. Draw only one line from each action.

<table>
<thead>
<tr>
<th>List A – Action</th>
<th>List B – Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating loop in flame</td>
<td>Risk of contamination with bacteria increased</td>
</tr>
<tr>
<td>Placing loop on bench to cool</td>
<td>Fewer bacteria will enter</td>
</tr>
<tr>
<td>Only lifting lid of Petri dish a little</td>
<td>Kills bacteria</td>
</tr>
<tr>
<td>Placing Petri dish in incubator at 25°C</td>
<td>Prevents air entering</td>
</tr>
<tr>
<td></td>
<td>Risk of growth of pathogens decreased</td>
</tr>
</tbody>
</table>

(Total 4 marks)
Q7. The image below shows some cells in the lining of the stomach.

(a) (i) Use words from the box to name structures A and B.

<table>
<thead>
<tr>
<th>cell membrane</th>
<th>chloroplast</th>
<th>cytoplasm</th>
<th>vacuole</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(ii) What is the function of the nucleus?

Tick (✓) one box.

- To control the activities of the cell
- To control movement of substances into and out of the cell
- To release energy in respiration

(b) Draw one line from each part of the human body to its correct scientific name.
<table>
<thead>
<tr>
<th>Part of human body</th>
<th>Scientific name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layer of cells lining the stomach</td>
<td>An organ</td>
</tr>
<tr>
<td>Stomach</td>
<td>An organism</td>
</tr>
<tr>
<td>Mouth, stomach, intestines, liver and pancreas</td>
<td>An organ system</td>
</tr>
<tr>
<td></td>
<td>A tissue</td>
</tr>
</tbody>
</table>

(3) (Total 6 marks)
Q8. The diagram below shows a cell.

(a) Draw a ring around the correct answer to complete each sentence.

(i) In the nucleus of a cell, genes are part of

- membranes.
- receptors.
- chromosomes.

(ii) Different genes control different

- characteristics
- gametes
- nuclei

(iii) Studying the similarities and differences between organisms allows us to

- classify
- clone
- grow
- the organisms.
(b) Complete the following sentence.

Living things can be grouped into animals, microorganisms and .................. .

(1)
(Total 4 marks)
Q9. The diagram shows a method used to grow pure cultures of a bacterium.

(a) Name apparatus A and apparatus B.

Apparatus A .............................................................

Apparatus B .............................................................

(2)

(b) (i) Why should apparatus A and apparatus B be sterilised before they are used?

...............................................................................................................

...............................................................................................................

(1)

(ii) How should apparatus A be sterilised?

Tick (✓) one box.

Using enzymes

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(iii) Adhesive tape is used to secure the lid on apparatus B.

Give one reason why the lid of apparatus B should be securely taped in place.

.............................................................................................................
.............................................................................................................
.............................................................................................................

(1)

(c) What is the maximum temperature that should be used in schools to grow the bacteria in apparatus B?

Draw a ring around the correct answer.

10 °C  25 °C  50 °C

(1)

(Total 6 marks)
Q10. Human cells and yeast cells have some parts that are the same.

(a) The diagram shows a yeast cell.

![Diagram of a yeast cell with parts A and B labeled.]

Parts A and B are found in human cells and in yeast cells. On the diagram, label parts A and B.

(b) Many types of cell can divide to form new cells.

Some cells in human skin can divide to make new skin cells.

Why do human skin cells need to divide?

........................................................................................................................
........................................................................................................................

(1)

(c) Human stem cells can develop into many different types of human cell.

(i) Use the correct answer from the box to complete the sentence.

<table>
<thead>
<tr>
<th>embryos</th>
<th>hair</th>
<th>nerve cells</th>
</tr>
</thead>
</table>

Human stem cells may come from

........................................................................................................................

(1)
(ii) Use the correct answer from the box to complete the sentence.

| cystic fibrosis | paralysis | polydactyly |

Human stem cells can be used to treat .........................................................................................................................

(1) (Total 5 marks)