1 **(a)** Table 6.1 gives the functions of certain organelles in a eukaryotic cell.

Complete the table by stating the function associated with each organelle.

The first row has been completed for you.

Organelle	Function
nucleus	contains the genetic material
smooth endoplasmic reticulum	....
lysosome	....
ribosome	....

[3]

Table 6.1

(b) One theory about the evolution of organelles is the endosymbiotic theory. This theory suggests that the mitochondria and chloroplasts found in eukaryotic cells represent formerly free-living bacteria that were absorbed into a larger cell.

The following list describes a number of features of mitochondria and chloroplasts.

Place a tick (✓) next to the **three** statements that could be used as evidence for the endosymbiotic theory.

- mitochondria contain ribosomes that are smaller than those found in the cell cytoplasm ☐
- chloroplasts contain chlorophyll and other photosynthetic pigments ☐
- mitochondria are a similar size to bacteria ☐
- the inner membrane of a mitochondrion is folded to form cristae ☐
- chloroplasts contain many disc-shaped membranes called thylakoids ☐
- chloroplasts have their own circular DNA ☐

[3]

[Total: 6]

2 Plant and animal cells have different structural features.

(a) (i) Name **two** features of plant cells that are not features of animal cells.

1 .....

2 .....

[2]

(ii) Name **one** structure present in animal cells that is not present in plant cells.

..... **[1]**

(iii) The cytoskeleton in cells consists of microtubules and microfilaments.

Describe the roles of the cytoskeleton.

.....

.....

.....

.....

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.....

.....

..... **[3]**

(b) The pancreas is an organ that secretes protease enzymes.

Outline how the organelles in pancreatic cells work together to produce and release these protein molecules from the cells.

In your answer you should use appropriate technical terms, spelled correctly.

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..... **[5]**

[Total: 11]

3 Fig. 1.1 is a diagram of a plant cell.

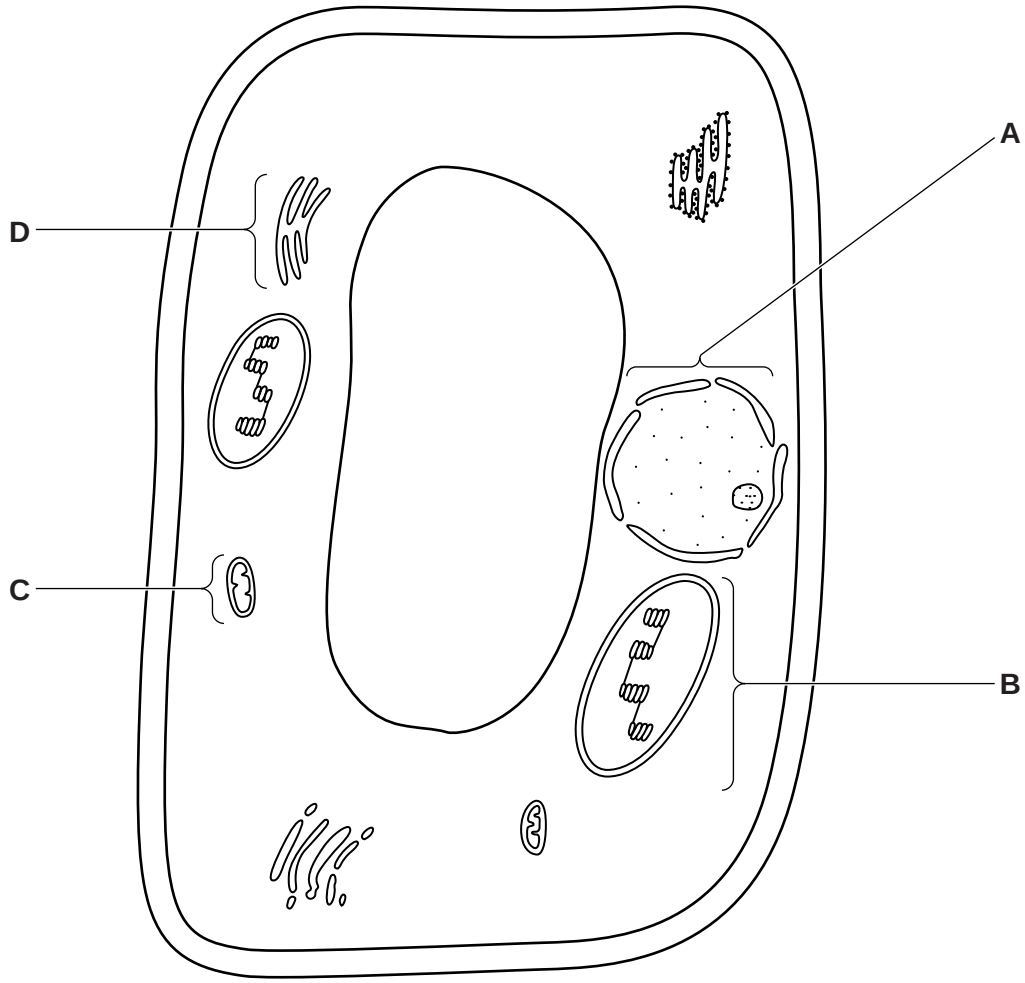

Fig. 1.1

(a) (i) Name the cell components labelled **A** and **B**.

A .....

B .....

[2]

(ii) State the **functions** of the components labelled **C** and **D**.

C .....

.....

.....

D .....

.....

.....

[2]

(b) A student suggested that the details of component **C** could be seen clearly with a very good light microscope.

Explain why the student is **not** correct.

.....

.....

.....

.....

.....

.....

..... **[2]**

(c) Staining is a process often used in microscopy.

Describe the **advantages** of staining specimens to be viewed under a microscope.

.....

.....

.....

.....

.....

..... **[2]**

[Total: 8]

4 **(a)** Complete Table 5.1 below which compares different types of cell.

Place a tick (✓) or a cross (✗) in each box to indicate whether the feature is present or absent. The first row has been completed for you.

	Cell type		
Feature	**Plant cell**	**Animal cell**	**Bacterial cell**
mitochondria	✓	✓	✗
chloroplasts			
cellulose cell wall			
centrioles			
ribosomes			

Table 5.1 **[4]**

(b) In an investigation, cells were broken up (homogenised) and the component organelles were separated into tubes.

Each tube was then tested to determine the identity of the component organelle(s).

The observations are shown in Table 5.2.

Test for the…	**Tube**			
	1	**2**		
ability to make ATP	no ATP produced	ATP produced	no ATP produced	no ATP produced
presence of DNA	DNA present	trace amount	no DNA present	no DNA present
ability to produce proteins	no proteins made	no proteins made	no proteins made	proteins made
ability to digest bacteria	none	some ability	none	none

Table 5.2

(i) Identify the tube that contains the following organelles:

nuclei .....

ribosomes .....

mitochondria .....

lysosomes ..... **[4]**

(ii) Which of the organelles listed in **(i)** is the smallest in size?

..... **[1]**

[Total: 9]

5 Fig. 2.1 is a diagram of a cell showing the organelles involved in the production and secretion of an extracellular protein. The rough endoplasmic reticulum (RER) is shown enlarged at the side of the diagram.

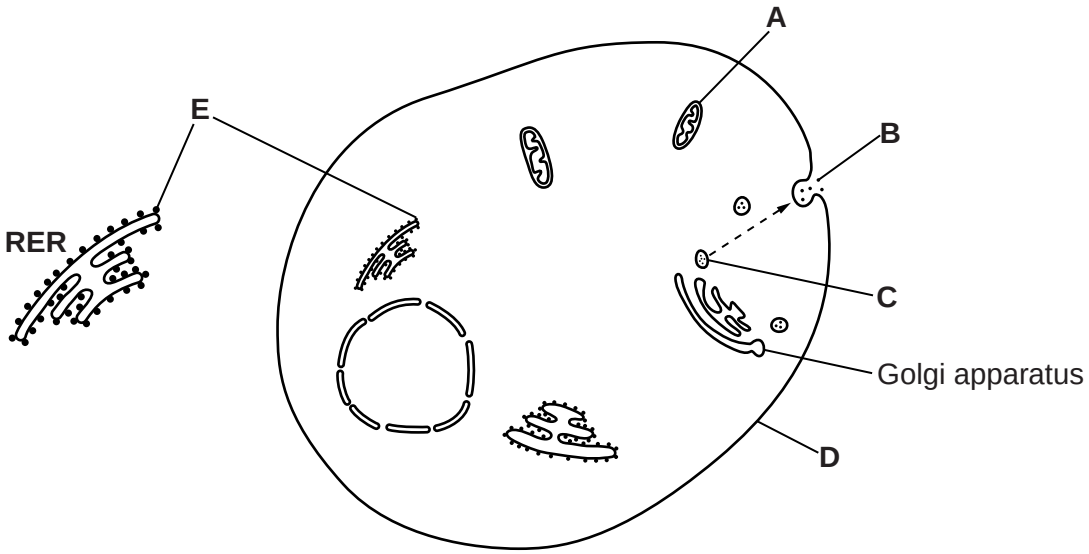

Fig. 2.1

(a) (i) Name the structures labelled **C**, **D** and **E**.

C .....

D .....

E ..... **[3]**

(ii) Suggest **one** type of extracellular protein secreted at **B**.

..... **[1]**

(iii) Organelle **A** provides ATP which is a source of energy.

Suggest **one** stage during the secretion of a protein that requires energy.

.....

..... **[1]**

(iv) Outline the role of the Golgi apparatus.

.....

.....

.....

.....

.....

..... **[2]**

(b) The cell shown in Fig. 2.1 is a eukaryotic cell.

(i) Identify **two** features, **visible in Fig. 2.1**, which would **not** be present in a prokaryotic cell.

.....

.....

.....

..... **[2]**

(ii) Name **one** feature that would be present in the cytoplasm of a prokaryotic cell that is **not** found in a eukaryotic cell.

..... **[1]**

[Total: 10]

6 **(a)** A student wanted to observe some red blood cells under the microscope. The student placed a small sample of blood onto a microscope slide and added a drop of distilled water. When viewed at high power, the student observed that the red blood cells had burst.

In a similar procedure using plant epidermis, the student observed that the plant cells did not burst.

(i) Explain these observations.

In your answer you should use appropriate technical terms, spelt correctly.

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..... **[5]**

(ii) Suggest how the student could modify the procedure to observe red blood cells without them bursting.

.....

.....

..... **[1]**

(b) Oxygen enters red blood cells as they pass through the capillaries in the lungs.

Name the mechanism by which oxygen enters the red blood cells.

..... **[1]**

(c) The cells in the epidermis of a plant root are specialised to absorb minerals from the surrounding soil.

State the process by which root epidermal cells absorb minerals from the soil **and** describe how these cells are specialised to achieve absorption.

.....

.....

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.....

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..... **[3]**

[Total: 10]