2. Organisation of the organism

2.1 Cell structure

Paper 3 and 4

Question Paper

Paper 3

Questions are applicable for both core and extended candidates

1 Fig. 1.1 shows a diagram of an animal cell and a bacterial cell.

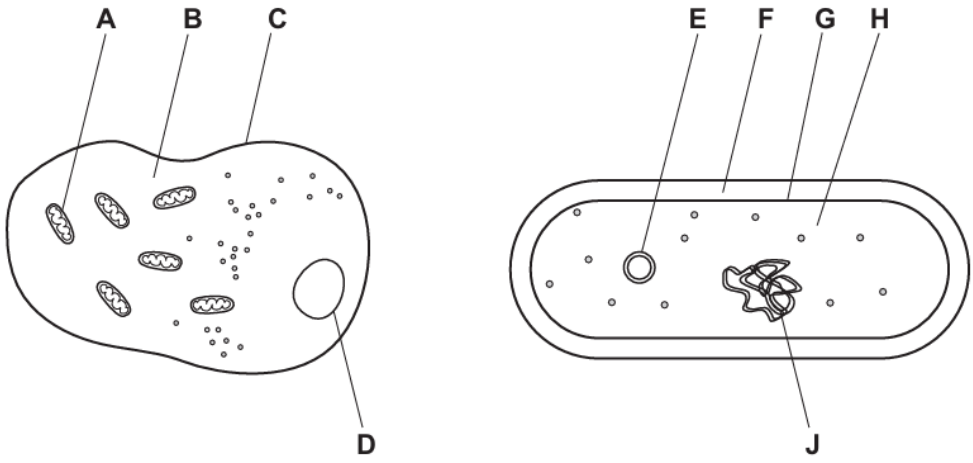


Fig. 1.1

(a) Complete Table 1.1 by identifying the structures labelled **B** to **J** in Fig. 1.1.

Some structures may **not** be present in both cells.

One row has been completed for you.

Table 1.1

structure	animal cell	bacterial cell
cell membrane		
cell wall		
cytoplasm		
mitochondrion	**A**	
nucleus		
plasmid		

[5]

(b) State the function of mitochondria.

..... [1]

(c) Egg cells and sperm cells are examples of specialised animal cells.

Place ticks (✓) in Table 1.2 to show the correct adaptive feature for each type of cell.

Table 1.2

adaptive feature	egg cell	sperm cell
energy store		
enzymes in the acrosome		
flagellum		
jelly coat		

[4]

[Total: 10]

2 **(c)** Explain why the leaf can be described as an organ.

.....

.....

.....

.....

..... [2]

3 **(b)** This list shows some specialised animal and plant cells.

ciliated cell	**guard cell**
neurone	**palisade mesophyll cell**
red blood cell	**white blood cell**

Choose words from the list to state the names of:

- two specialised plant cells

  ..... and .....

- the cell that transports oxygen

  .....

- the cell found in the trachea that moves mucus.

  .....

[4]

(c) State how new cells are produced.

.....

..... [1]

(d) Fig. 7.2 is a drawing of another specialised cell.

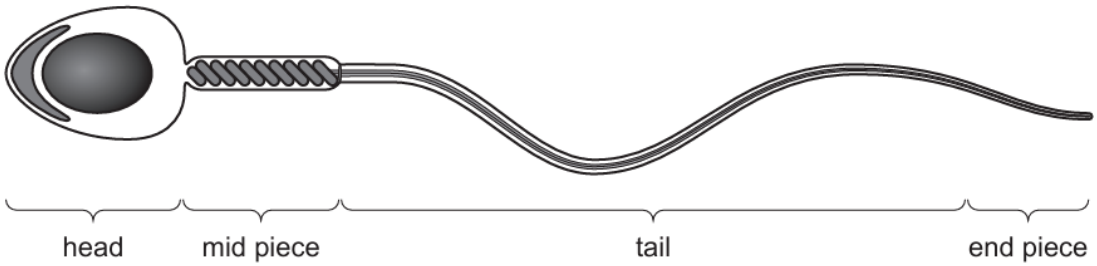


Fig. 7.2

(i) Label **three** cell structures in Fig. 7.2 with label lines and the correct names. [3]

(ii) State the name of the cell shown in Fig. 7.2.

..... [1]

4 **(e)** State **two** cell structures that are found in both bacteria and plants.

1 .....

2 .....
[2]

5 **(a)** **(i)** Fig. 6.1 is a diagram of a bacterial cell.

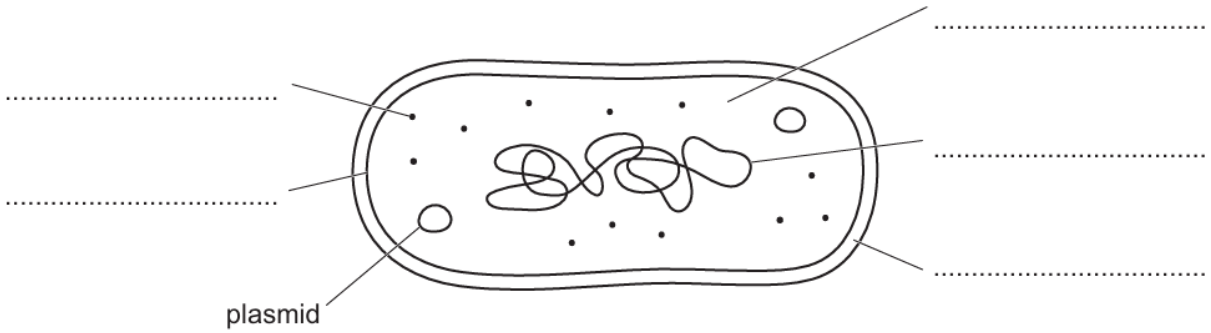


Fig. 6.1

Complete Fig. 6.1 by using the words in the list to label these structures on the answer lines provided.

- cell membrane
- cell wall
- circular DNA
- cytoplasm
- ribosome

[4]

(ii) State the names of **two** structures in the cell in Fig. 6.1 that are **not** found in animal cells.

1 .....

2 .....
[2]

(iii) Describe the function of plasmids in bacterial cells.

.....

.....

..... [1]

6 **(a)** Fig. 2.1 is a diagram showing some of the structures found in a plant cell.

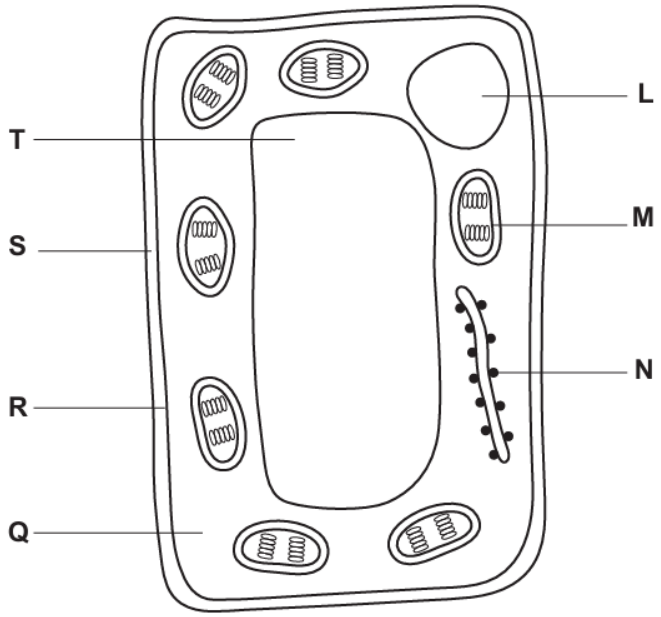


Fig. 2.1

Table 2.1 shows the names of some plant cell structures, their functions and the letters that identify them in Fig. 2.1.

Complete Table 2.1 by writing the missing name, letters and functions in the spaces provided.

Table 2.1

name of structure	letter from Fig. 2.1	**one** function
chloroplast		site of photosynthesis
ribosome	**N**	
cell wall		prevents the cell bursting
	L	

[5]

(b) **(i)** State the name of **one** cell structure that is found in plant cells but **not** in animal cells.

..... [1]

(ii) State the name of **one** cell structure that is found in plant cells **and** in animal cells.

..... [1]

(c) Fig. 2.2 is a diagram of a specialised plant cell.

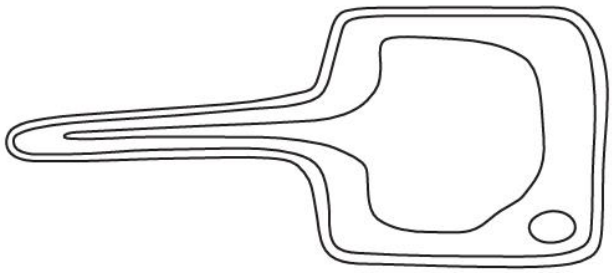


Fig. 2.2

State the name of the cell shown in Fig. 2.2 and describe how it is adapted for its function.

.....

.....

.....

.....

..... [3]

[Total: 10]

7 **(b)** The three structures listed are found inside cells.

allele **chromosome** **nucleus**

List these **three** components in order of size starting with the smallest.

..... smallest

.....

..... largest

[1]

8 Table 8.1 shows the levels of organisation in living organisms and some examples.

Place ticks (✓) in the boxes to show the correct level of organisation for each example.

Table 8.1

example	level of organisation				
	cell	tissue	organ	organ system	organism
circulatory					
epidermis					
pancreas					
tree					
sperm					

[5]

9 **(a)** Fig. 1.1 is a diagram of a plant cell.

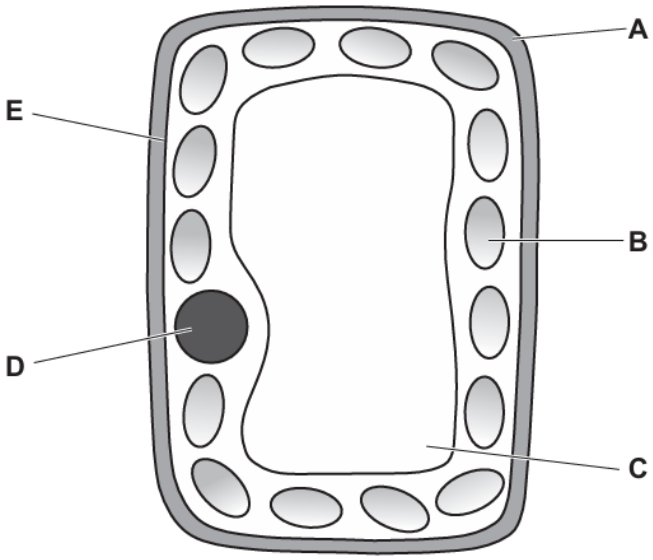


Fig. 1.1

The boxes on the left contain the letters that identify some parts of the plant cell in Fig. 1.1.
The boxes on the right show the functions of some parts of a cell.
Draw **five** lines to link each letter to its correct function.

letter from Fig. 1.1	**function**
	contains the genetic material
A	
	controls which substances enter and leave the cell
B	
	filled with sap to support the cell
C	
	strengthens the cell
D	
	transports nerve impulses
E	
	where photosynthesis occurs

[5]

(b) State the names of **two** different types of plant cell.

1 .....

2 .....

[2]

10 **(a)** Fig. 1.1 is a diagram of an animal cell.

Fig. 1.1

Label **three** structures **on the cell** shown in Fig. 1.1, using label lines and the names of the structures. [3]

(b) State **two** structures that are found in plant cells but **not** in animal cells.

1 .....

2 .....
[2]

[Total: 5]

11 Fig. 2.1 shows a plant cell after it has been in a solution of glucose for fifteen minutes.

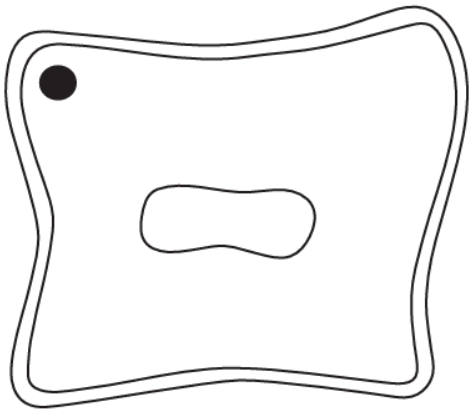


Fig. 2.1

(a) Draw label lines **on Fig. 2.1** to link each label to the correct structure. [3]

(b) The plant cell in Fig. 2.1 was then placed in distilled water.

Fig. 2.2 shows the appearance of the cell after fifteen minutes in distilled water.

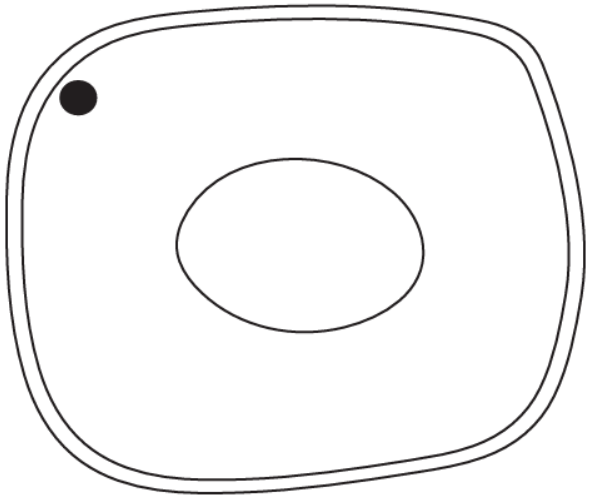


Fig. 2.2

(i) State **two** ways in which the plant cell has changed.

1 .....

.....

2 .....

.....

[2]

(ii) Explain why the plant cell changed when it was placed in distilled water.

.....

.....

.....

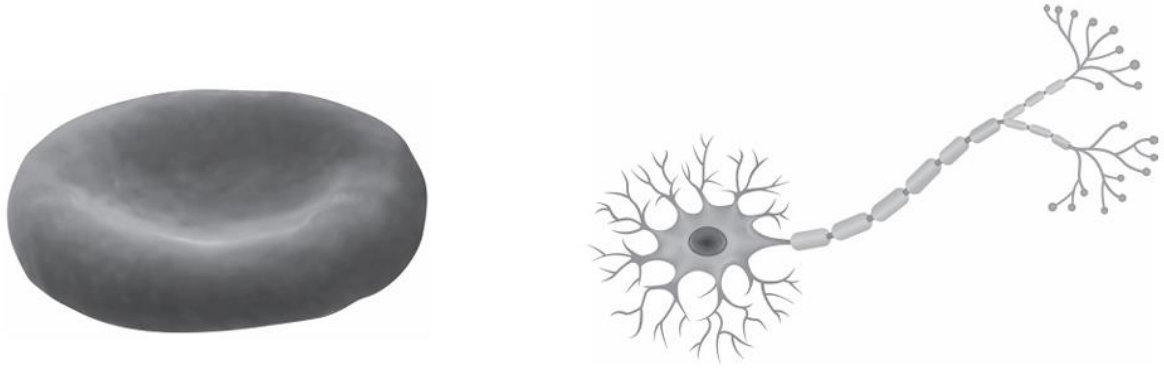
.....

.....

..... [3]

[Total: 8]

12 Fig. 6.1 shows images of cells from two different organ systems.



A B

not to scale

Fig. 6.1

(a) State the names of the cells shown in Fig. 6.1.

cell **A** .....

cell **B** .....

[2]

(b) Complete the definition of the term *tissue* by inserting the missing words.

A tissue is a group of cells with similar ..... working together to perform a shared ..... .

[2]

(c) State the names of the organ systems these organs belong to.

brain .....

stamen .....

ovary .....

[3]

[Total: 7]

13 **(c)** State **two** structures that are present in plant cells but **not** in animal cells.

1 .....

2 .....

[2]

14 The boxes on the left contain the functions of some plant cell structures.

The boxes on the right contain the names of structures found in plant cells.

Draw **one** straight line from each box on the left to a box on the right to link the plant cell function to the correct plant cell structure.

Draw **four** lines.

plant cell function	**plant cell structure**
	cell membrane
controls cell activities	
	cell wall
controls movement of chemicals into and out of cells	
	chloroplast
makes glucose	
	nucleus
prevents cell from bursting	
	vacuole

[4]

15 **(a)** Fig. 4.1 is a diagram of a palisade mesophyll cell.

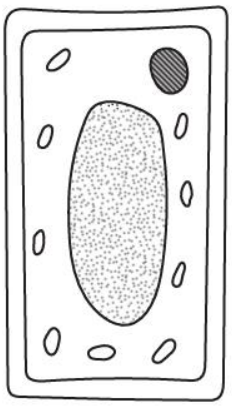


Fig. 4.1

Identify and label the nucleus and a chloroplast on Fig. 4.1. [2]

16 **(b)** Xylem is an example of a plant tissue.

This list shows examples of tissues, organs and organ systems in humans.

heart **fat (under the skin)**

kidney **lung** **nervous system**

Complete Table 3.1 using the examples from the list.

One has been done for you.

Table 3.1

tissue	organ	organ system
		nervous system

[4]

(c) The list shows some of the structures in a plant.

Write the structures in order of size from smallest to largest.

chloroplast **palisade cell** **phloem tissue**

root **whole plant**

..... smallest

.....

.....

.....

..... largest

[3]

17 **(b)** A specialised cell performs a particular function.

Sperm and egg cells are two types of specialised cell that are involved in reproduction in humans.

State the names of **two other** specialised cells.

1 .....

2 .....

[2]

18 **(b)** State **three** structures present in both animal and plant cells.

1 .....

2 .....

3 .....

[3]

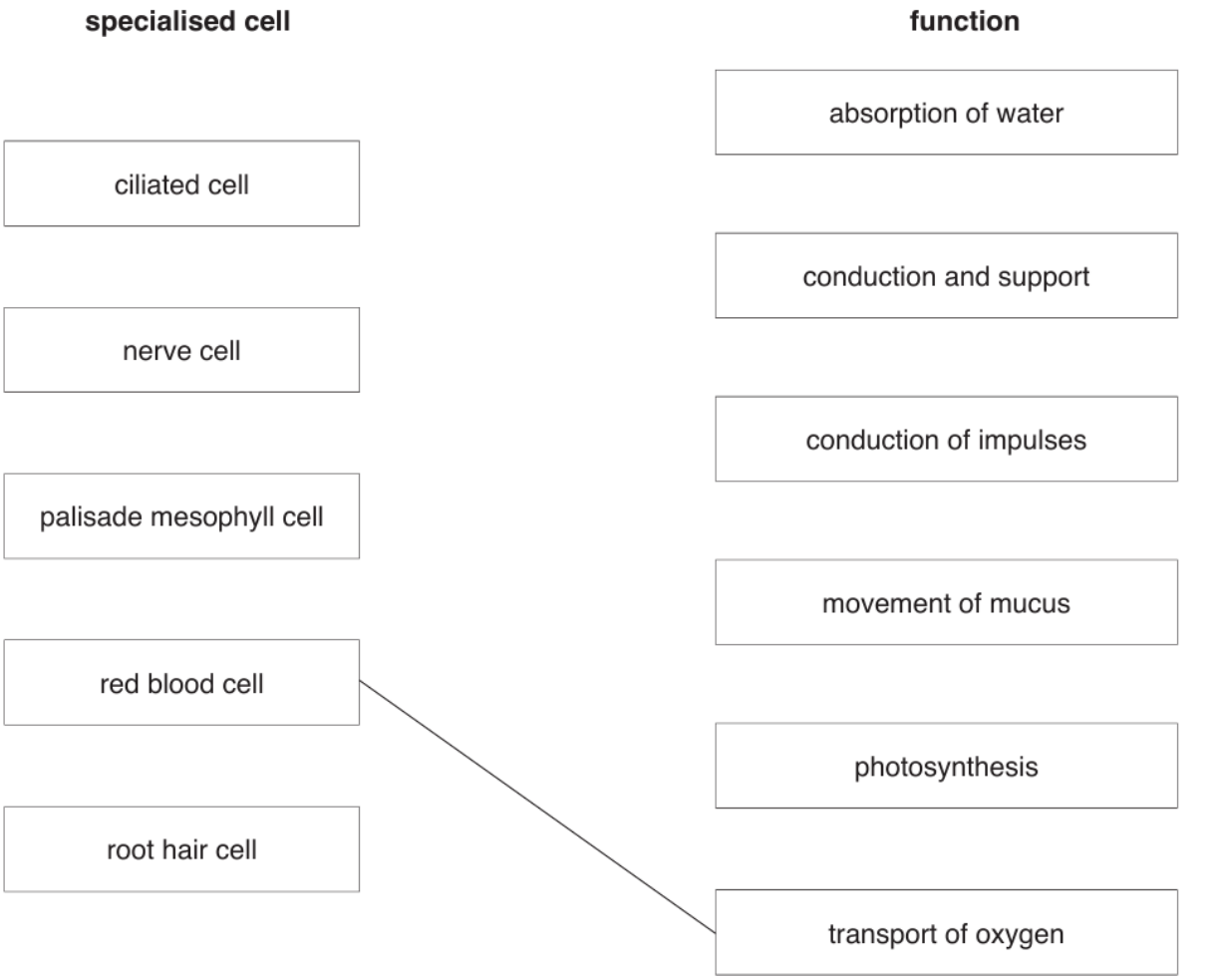
19 **(d)** Sperm and egg cells are specialised cells that are adapted for reproduction.

The boxes on the left show some specialised cells.

The boxes on the right show the functions of some specialised cells.

Draw **four** lines to link each specialised cell with its function.

One has been done for you.



[4]

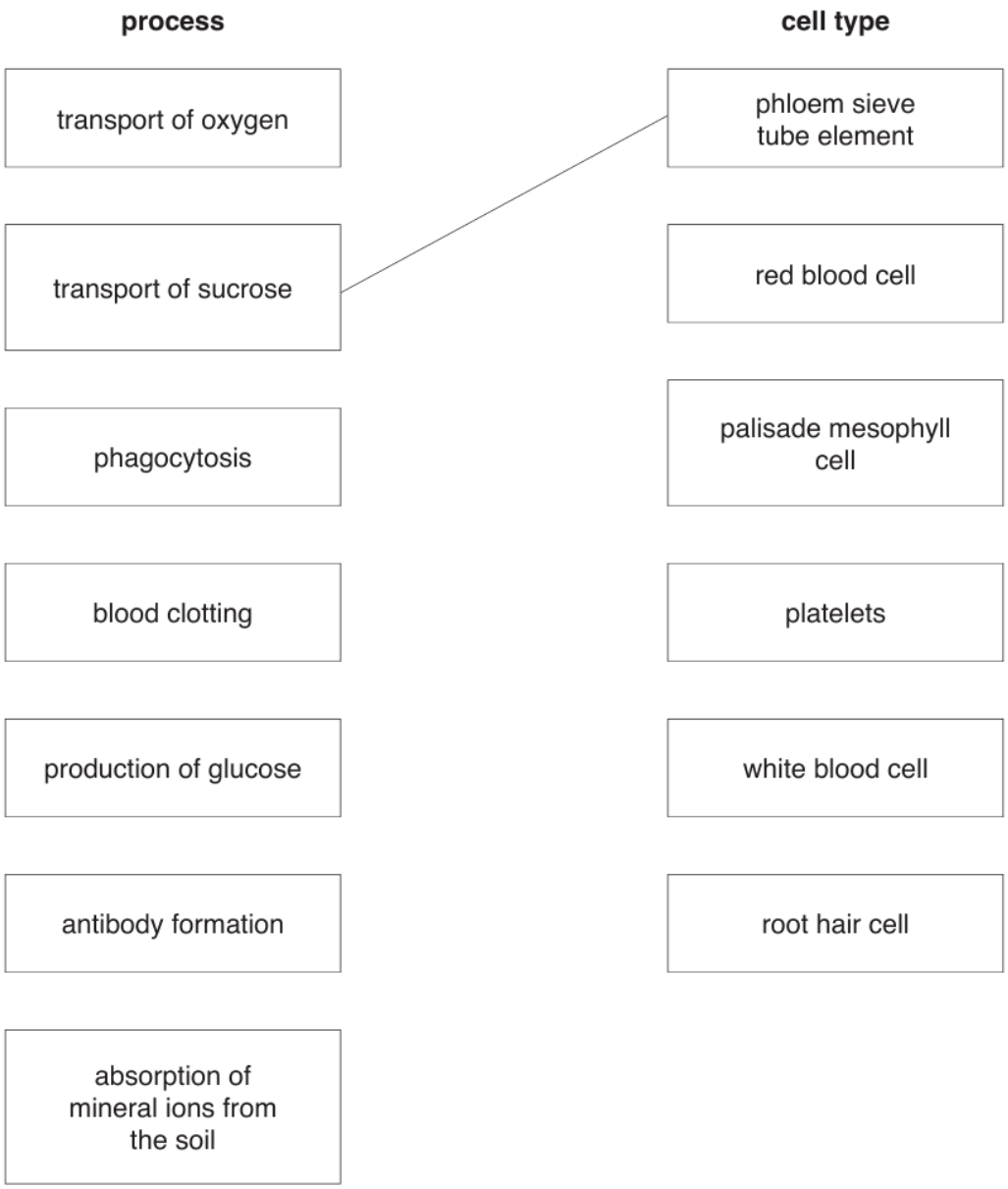
20 **(a)** The boxes on the left describe processes carried out by cells.

The boxes on the right contain the names of the cells that carry out these processes.

Draw **one** straight line from each box on the left to a box on the right to link the process to the cell type.

Draw **six** lines.

An example has been done for you.



[6]

Paper 4

Questions are applicable for both core and extended candidates

21 **(a)** Fig. 3.1 shows a drawing of a root hair cell and Fig. 3.2 shows a drawing of a palisade cell.

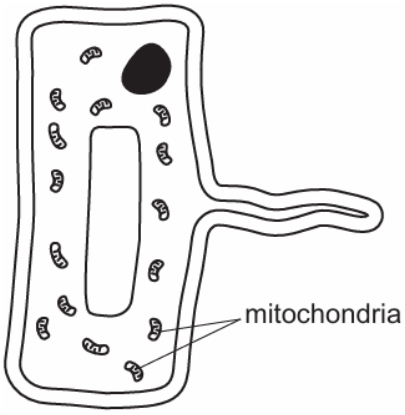


Fig. 3.1

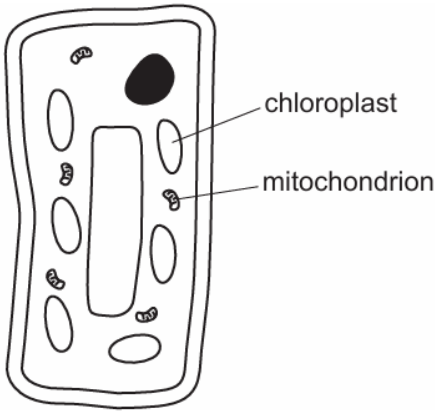


Fig. 3.2

Explain the reasons for the difference in the **numbers** of mitochondria and chloroplasts between the root hair cell and the palisade cell, shown in Fig. 3.1 and Fig. 3.2.

mitochondria .....

.....

.....

.....

.....

chloroplasts .....

.....

.....

.....

.....

[5]

22 Fungal cells and plant cells contain mitochondria.

(a) (i) State the function of mitochondria.

..... [1]

(ii) State **one** feature of plants that is used to distinguish them from fungi.

.....

.....

..... [1]

23 **(a)** Fig. 3.1 shows the structure of the pathogen that causes cholera.

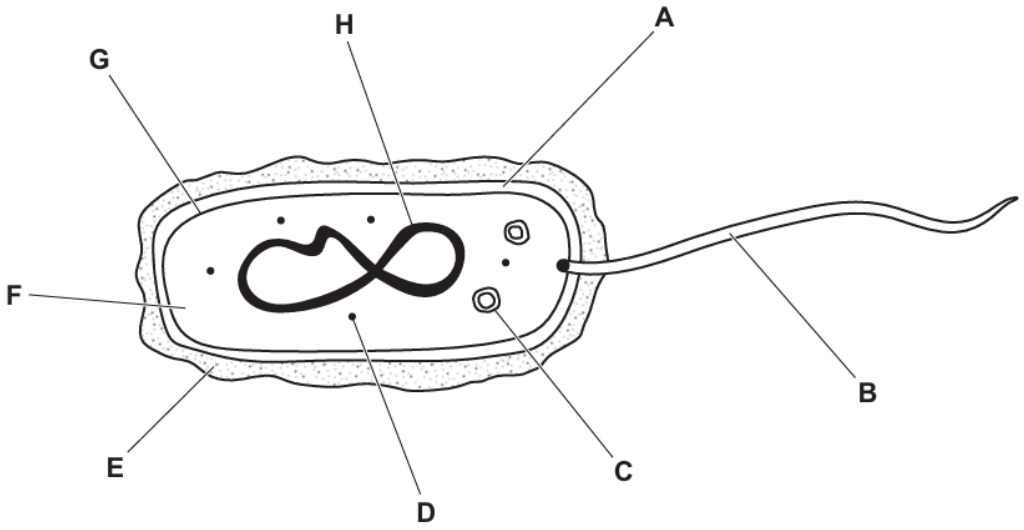


Fig. 3.1

(i) State the name of the kingdom that includes the pathogen shown in Fig. 3.1.

..... [1]

(ii) Table 3.1 shows some of the names, functions or uses, and identifying letters of the parts labelled in Fig. 3.1.

Complete Table 3.1.

Table 3.1

name	function or use	letter from Fig. 3.1
flagellum		
		G
	protein synthesis	
cell wall		
	used by humans in genetic modification	

[5]

24 Fig. 1.1 shows the structure of an organism from the genus *Chlorella*.

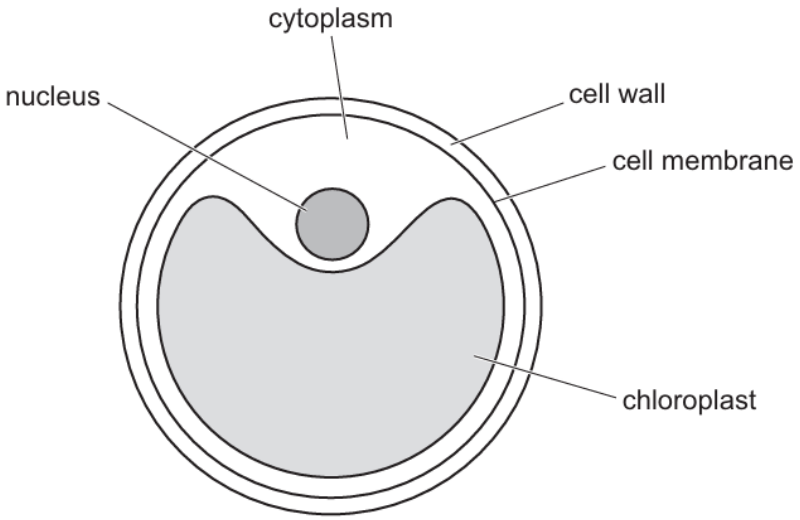


Fig. 1.1

(i) Identify **two** cell structures in Fig. 1.1 that indicate that *Chlorella* is **not** a prokaryote.

1 .....

2 .....
[2]

(ii) Identify **two** cell structures in Fig. 1.1 that are found in both fungi and protoctists.

1 .....

2 .....
[2]

(iii) State the names of **two other** kingdoms, apart from fungus, prokaryote and protoctist.

..... and ..... [1]

25 **(d)** Some cells in the small intestine have many mitochondria.

Fig. 2.2 shows the variation in the average number of mitochondria found in three different types of cell.

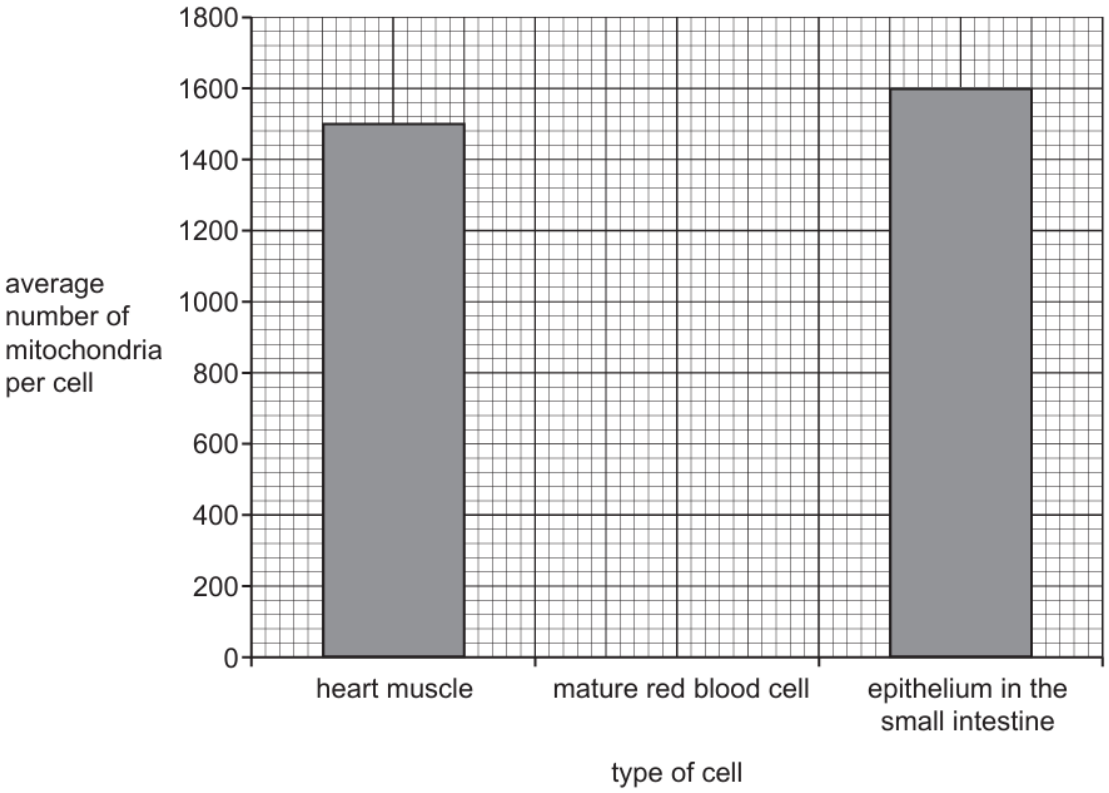


Fig. 2.2

Explain the differences in the average number of mitochondria in each type of cell.

.....

.....

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.....

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.....

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.....

.....

..... [5]

26 **(b)** Fig. 3.2 is a diagram of a rod cell and a cone cell from a human eye.

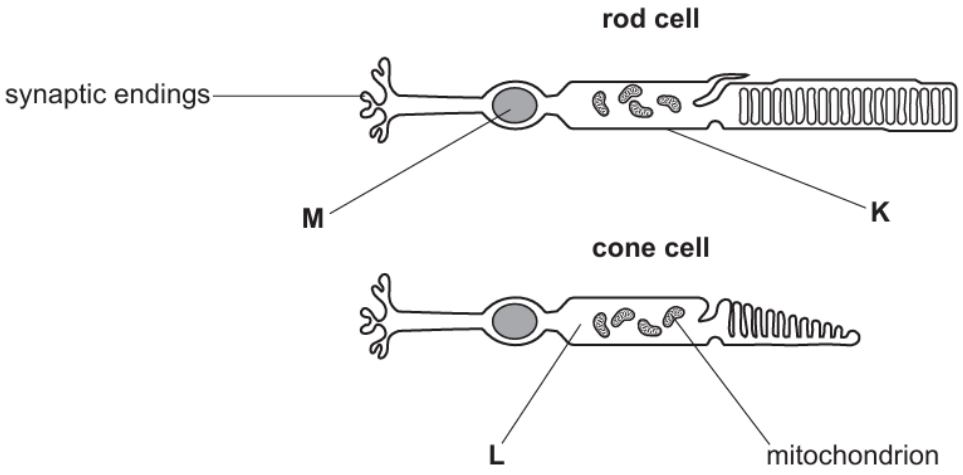

Fig. 3.2

(i) Identify cell structures **K**, **L** and **M** in Fig. 3.2.

K .....

L .....

M .....

[3]

(ii) State the names of the **two** parts of the mammalian central nervous system.

1 .....

2 .....

[1]

27 **(b)** Table 1.1 shows:

- the functions of some of the structures in plant cells
- some of the names of the structures where these functions occur
- some of the letters that label these structures in Fig. 1.1.

Complete Table 1.1.

Table 1.1

function	structure	letter in Fig. 1.1
	nucleus	
	chloroplast	
aerobic respiration		
contains cell sap and stores water		
		A

[5]

28 **(a)** Baker's yeast, *Saccharomyces cerevisiae*, is a single-celled organism that is classified in the kingdom Fungi.

Fig. 1.1 is a drawing of a section through a yeast cell.

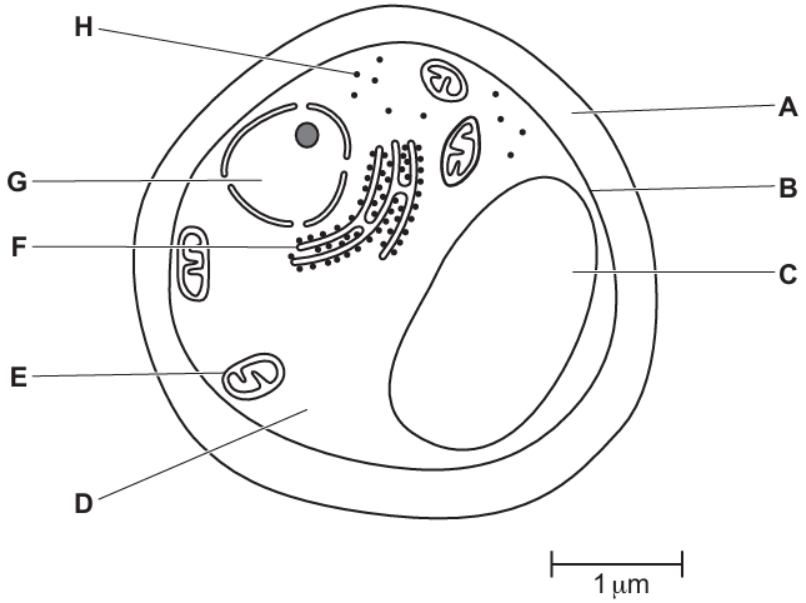

Fig. 1.1

(ii) Table 1.1 shows some cell functions.

Complete Table 1.1 by naming the cell structure responsible for each cell function and give the letter that identifies each cell structure in Fig. 1.1.

Table 1.1

cell function	cell structure	letter from Fig. 1.1
storage of genes		
aerobic respiration		
amino acids are assembled to make protein		

[3]

(c) Describe the similarities **and** differences between the structure of the yeast cell and the structure of the bacterial cell.

Use the information in Fig. 1.1 and Fig. 1.2 in your answer.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

29 **(e)** Complete Table 1.1 by identifying the level of organisation of each structure.

Choose your answers from the list. Each word or phrase may be used once, more than once or not at all.

cell **cell structure** **organ** **organ system** **organism** **tissue**

Table 1.1

structure	level of organisation
gall bladder	
endoplasmic reticulum	
intestinal epithelium	
ileum	

[4]

30 **(b)** Fig. 3.2 shows a drawing of a cell from the lining of the small intestine. The lumen is the space inside the intestine where food is digested.

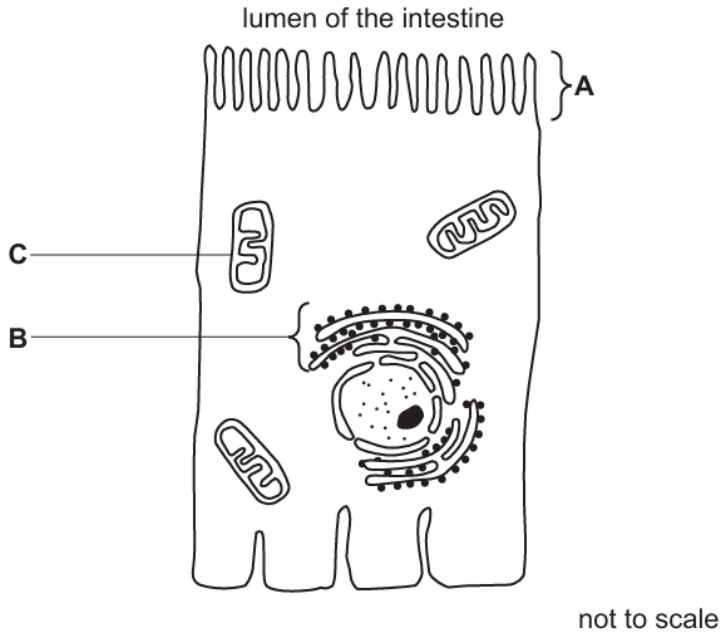

Fig. 3.2

State the names of the **three** labelled structures in Fig. 3.2 **and** describe the role of each structure in the intestinal cell.

.....

.....

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.....

.....

..... [6]

31 **(a)** Yeast cells have many structures in common with a plant cell.

Fig. 4.1 is a drawing of a yeast cell.

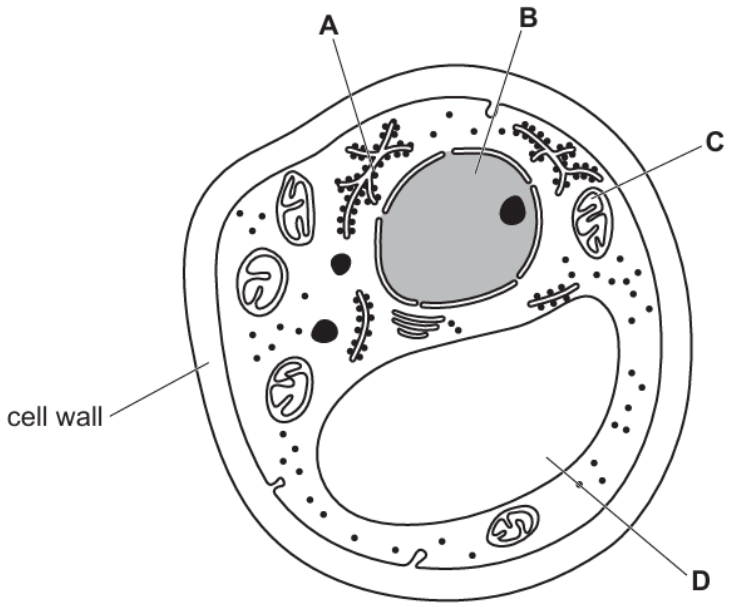


Fig. 4.1

(i) State the names of the cell structures labelled **A** and **D** on Fig. 4.1.

A .....

D .....

[2]

(ii) State the functions of the cell structures labelled **B** and **C** on Fig. 4.1.

B .....

C .....

[2]

(iii) State the name of **one** structure that is found in plant cells but is absent in yeast cells.

..... [1]

32 **(a)** Table 4.1 shows four structures associated with the human male reproductive system.

Complete Table 4.1 by identifying the level of organisation of each structure.

Choose your answers from the list.

cell **cell structure** **organ**

organ system **organism** **tissue**

Table 4.1

structure	level of organisation
epithelium	
nucleus	
sperm	
testis	

[4]

33 Phloem is used to transport sucrose and amino acids in plants. Sucrose is a carbohydrate.

(a) Describe the uses of carbohydrates **and** amino acids in plants.

.....

.....

.....

.....

.....

.....

..... [4]

34 **(c)** There are stem cells in the epithelial tissue that forms the lining of the stomach.

Explain why these stem cells are necessary.

.....

.....

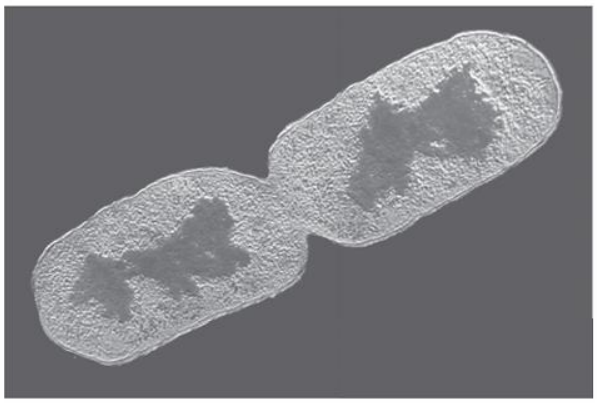
.....

.....

..... [2]

35 Bacteria are useful in biotechnology and genetic engineering.

Fig. 6.1 shows a photomicrograph of a bacterium.



magnification ×27 000

Fig. 6.1

(a) State the name of the process that is taking place in Fig. 6.1.

..... [1]