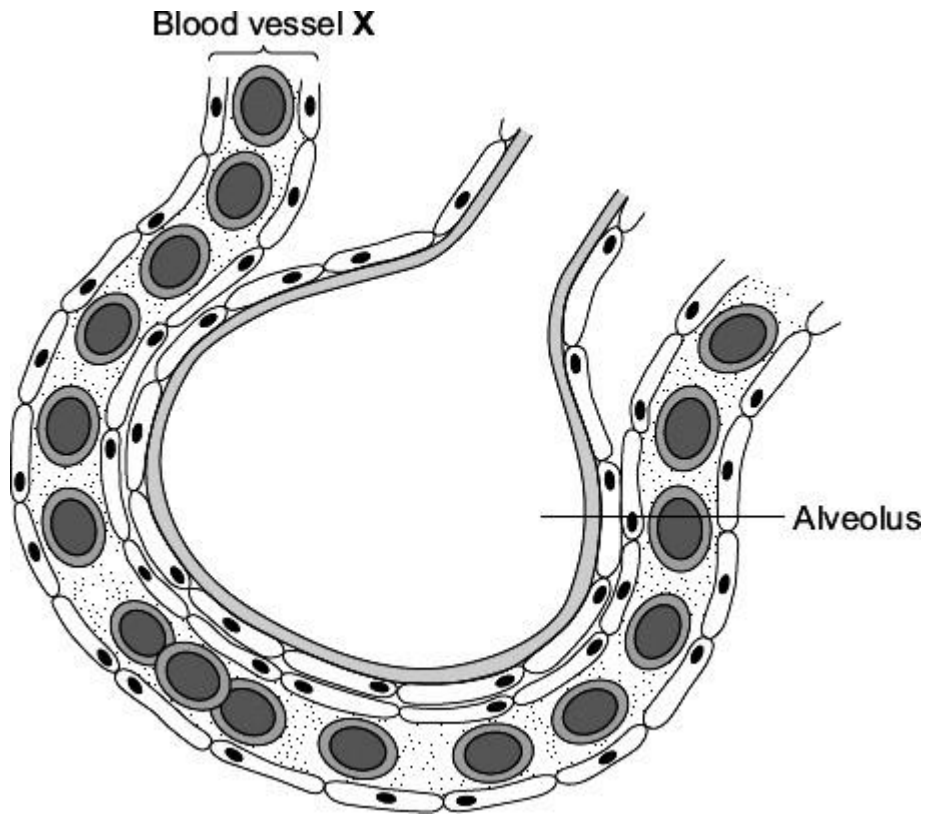


- 1 The diagram shows an alveolus and a blood vessel in the lung.



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

(i) Blood vessel X is

an artery.
a capillary.
a vein.

(1)

(ii) Gases pass across the wall of the alveolus by

diffusion.
evaporation.
fermentation.

(1)

(iii) The table compares the concentrations of some gases in inhaled air and exhaled air.

Complete the table.

Write 'lower' or 'higher' in each box.

One line has been completed for you as an example.

Gas	Concentration	
	Inhaled air	Exhaled air
Water vapour	lower	higher
Carbon dioxide		
Oxygen		

(2)

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

(i) Oxygen is carried in the blood mainly in

blood plasma.
red blood cells.
white blood cells.

(1)

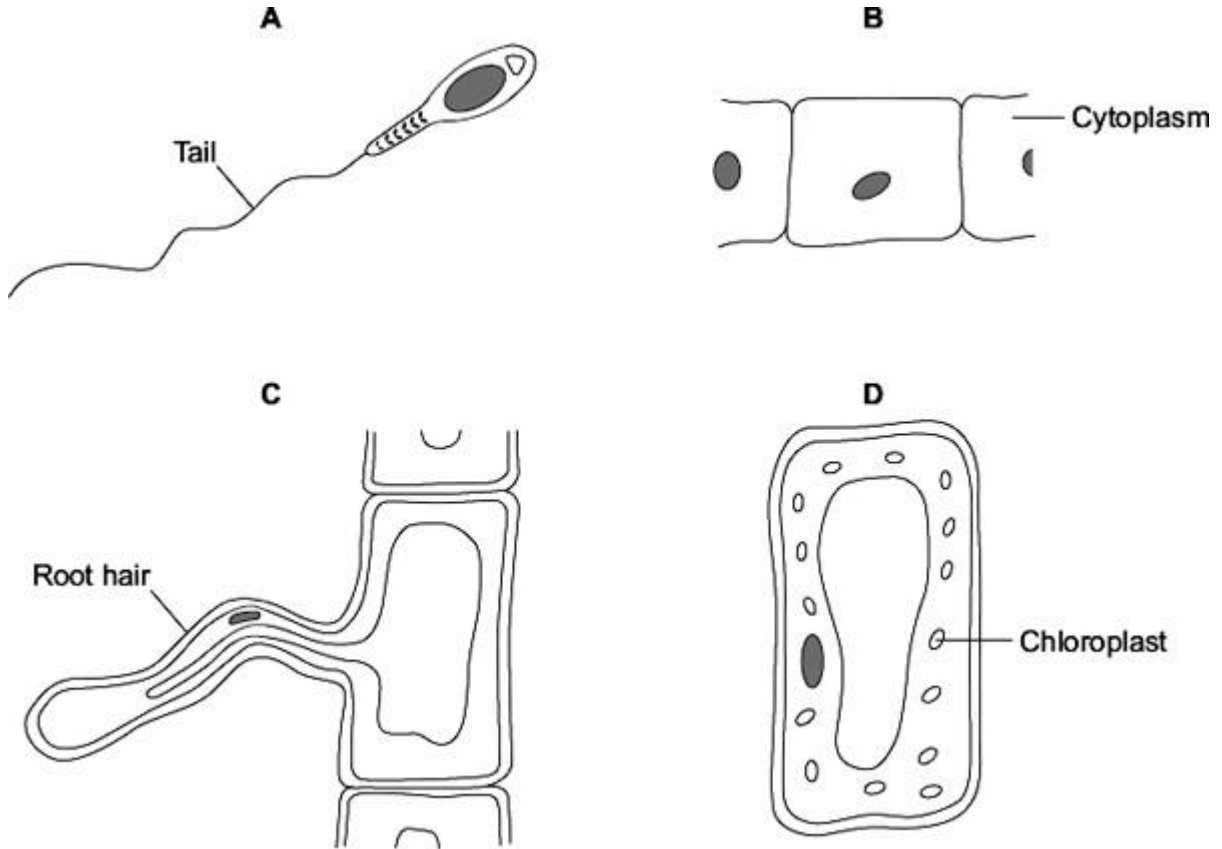
(ii) In the blood, the oxygen combines with

carbon dioxide.
haemoglobin.
urea.

(1)

(Total 6 marks)

- 2 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

(1)

- (ii) Which part is found **only** in plant cells?

Draw a ring around **one** answer.

cell membrane

cell wall

nucleus

(1)

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

(1)

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

(1)

(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

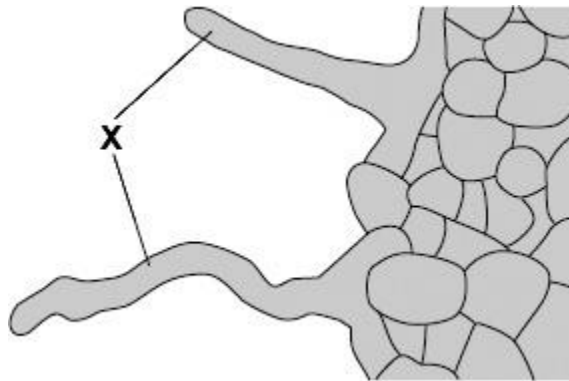
respiration

(1)

(Total 5 marks)

3

The diagram shows part of a plant root. A large number of structures like the ones labelled **X** grow out of the surface of the root.



(a) (i) What is the name of structure **X**?

Draw a ring around **one** answer.

root hair

stoma

villus

(1)

(ii) Name **two** substances which structure **X** absorbs from the soil.

1. _____

2. _____

(2)

- (b) The substances in (a)(ii) are transported from the roots to the leaves. Carbon dioxide also enters the leaves.

Draw a ring round the correct answer to complete each sentence.

- (i) Carbon dioxide enters leaves through

alveoli.
stomata.
villi.

(1)

- (ii) Carbon dioxide enters leaf cells by

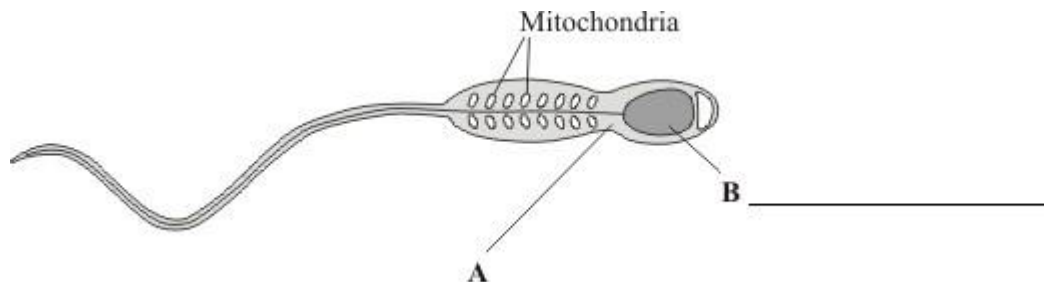
active transport.
diffusion.
reabsorption.

(1)

(Total 5 marks)

4 This question is about cells.

- (a) (i) The diagram shows a sperm cell.

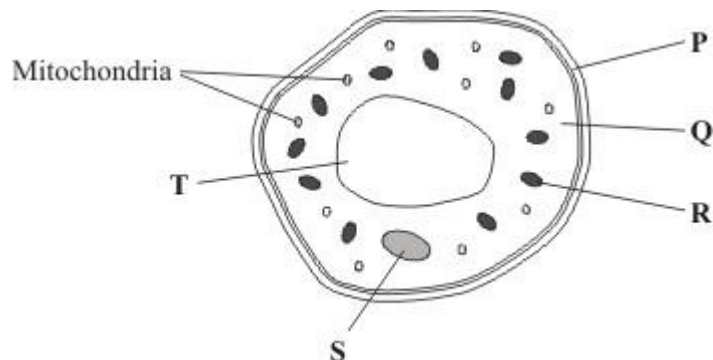


Use words from the box to label parts **A** and **B**.

cell membrane cytoplasm nucleus

(2)

- (ii) The diagram shows a cell from a leaf.



Give the letters of **two** parts of the leaf cell which would **not** be found in a sperm cell.

and .

(1)

(b) Sperm cells have many mitochondria.

Why do sperm cells need many mitochondria?

Tick () **one** box.

Sperm cells are involved in fertilisation.

Sperm cells are produced in very large numbers.

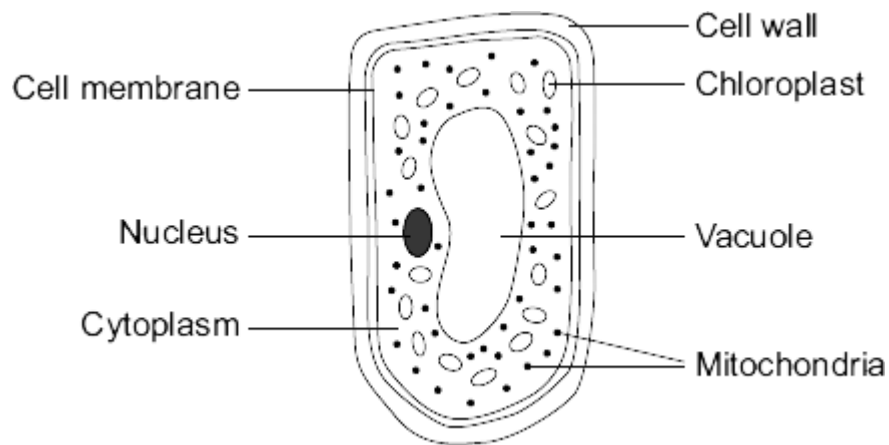
Sperm cells need a lot of energy to swim.

(1)

(Total 4 marks)

5

The diagram shows a cell from a plant leaf.



(a) Name the part of this cell that:

(i) controls the passage of substances in and out of the cell

(1)

(ii) is filled with cell sap.

(1)

(b) Give the names of **two** parts of the leaf cell that would **not** be found in a human liver cell.

_____ and _____

(2)

(c) The chloroplasts produce oxygen.

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

The oxygen produced by the chloroplasts passes out of the cell by

diffusion.
digestion.
respiration.

(1)

(Total 5 marks)

6

Substances can move into and out of cells.

(a) (i) How does oxygen move into and out of cells?

Draw a ring around **one** answer.

diffusion

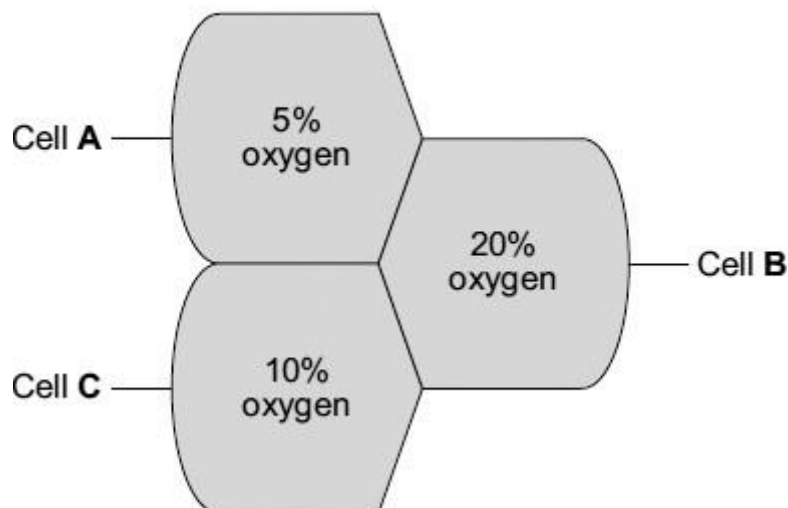
digestion

photosynthesis

(1)

(ii) **Diagram 1** shows the percentage concentration of oxygen in three cells, **A**, **B** and **C**.

Diagram 1



Oxygen can move from cell to cell.

Into which cell, **A**, **B** or **C**, will oxygen move the fastest?

(1)

- (b) (i) How does water move into and out of cells?

Draw a ring around **one** answer.

breathing

osmosis

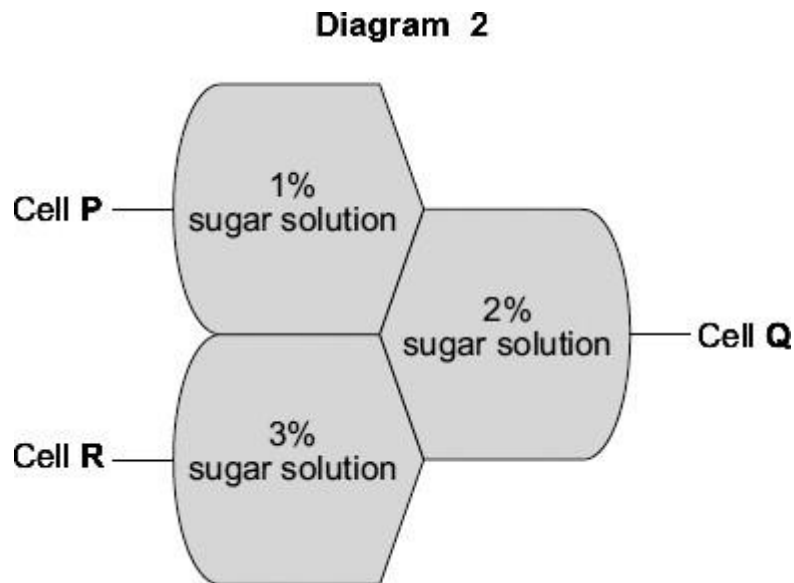
respiration

(1)

- (ii) Differences in the concentration of sugars in cells cause water to move into or out of cells at different rates.

Diagram 2 shows three different cells, **P**, **Q** and **R**.

The information shows the percentage concentration of sugar solution in cells **P**, **Q** and **R**.



Water can move from cell to cell.

Into which cell, **P**, **Q** or **R**, will water move the fastest?

(1)

(Total 4 marks)

7 Substances can move into and out of cells.

- (a) (i) How does oxygen move into and out of cells?

Draw a ring around **one** answer.

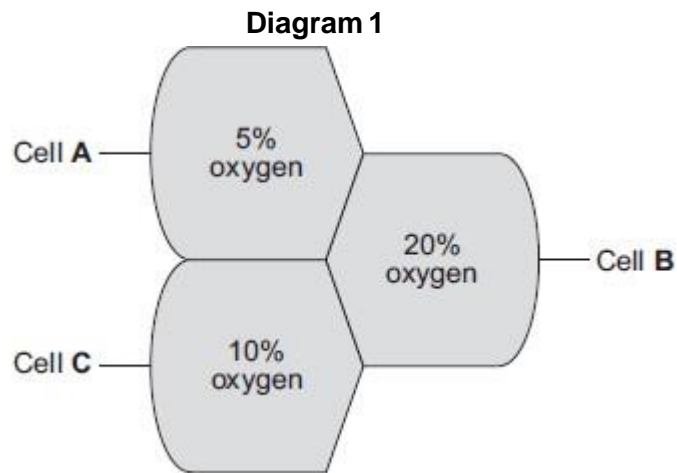
diffusion

digestion

photosynthesis

(1)

- (ii) **Diagram 1** shows the percentage concentration of oxygen in three cells, **A**, **B** and **C**.



Oxygen can move from cell to cell.

Into which cell, **A**, **B** or **C**, will oxygen move the fastest?

(1)

- (b) (i) How does water move into and out of cells?

Draw a ring around **one** answer.

breathing

osmosis

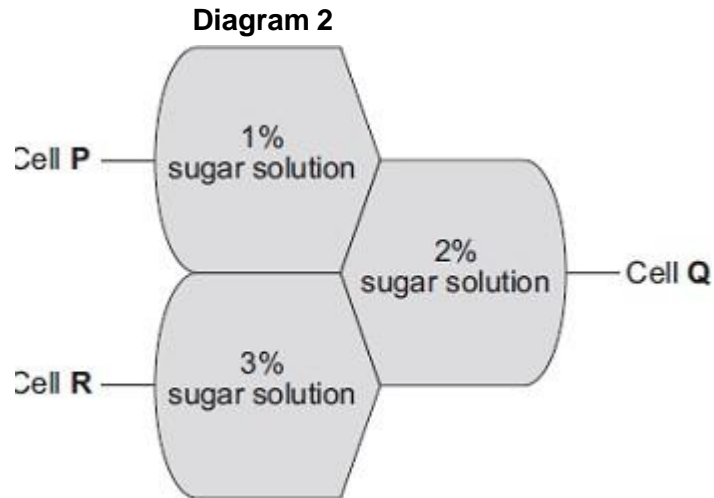
respiration

(1)

- (ii) Differences in the concentration of sugars in cells cause water to move into or out of cells at different rates.

Diagram 2 shows three different cells, **P**, **Q** and **R**.

The information shows the percentage concentration of sugar solution in cells **P**, **Q** and **R**.



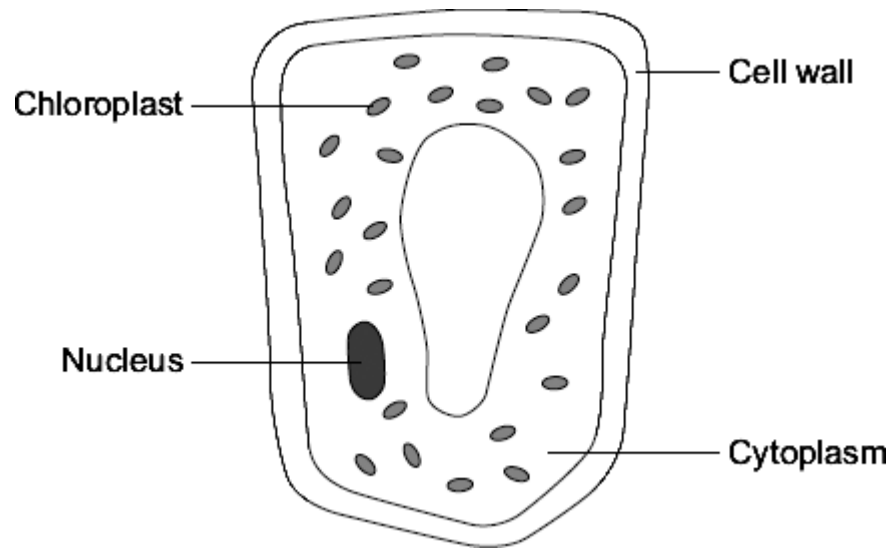
Water can move from cell to cell.

Into which cell, **P**, **Q** or **R**, will water move the fastest?

(1)
(Total 4 marks)

8

The diagram shows a plant cell from a leaf.



- (a) **List A** gives the names of three parts of the cell.
List B gives the functions of parts of the cell.

Draw a line from each part of the cell in **List A** to its function in **List B**.

List A
Parts of the cell

Nucleus

Cytoplasm

Chloroplast

List B
Functions

Where most of the chemical reactions take place

Absorbs light energy to make food

Strengthens the cell

Controls the activities of the cell

(3)

(b) Respiration takes place in the cell.

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

All cells use respiration to release

- energy
- oxygen.
- sugar.

(1)
(Total 4 marks)

9

Stem cells can be collected from human embryos and from adult bone marrow. Stem cells can develop into different types of cell.

The table gives information about using these two types of stem cell to treat patients.

Stem cells from human embryos	Stem cells from adult bone marrow
It costs £5000 to collect a few cells.	It costs £1000 to collect many cells.
There are ethical issues in using embryo stem cells.	Adults give permission for their own bone marrow to be collected.
The stem cells can develop into most other types of cell.	The stem cells can develop into only a few types of cell.
Each stem cell divides every 30 minutes.	Each stem cell divides every four hours.
There is a low chance of a patient's immune system rejecting the cells.	There is a high chance of a patient's immune system rejecting the cells.
More research is needed into the use of these stem cells.	Use of these stem cells is considered to be a safe procedure.

Scientists are planning a new way of treating a disease, using stem cells.

Use **only** the information above to answer these questions.

(a) Give **three** advantages of using stem cells from embryos instead of from adult bone marrow.

1. _____
2. _____
3. _____

(3)

(b) Give **three** advantages of using stem cells from adult bone marrow instead of from embryos.

1. _____

2. _____

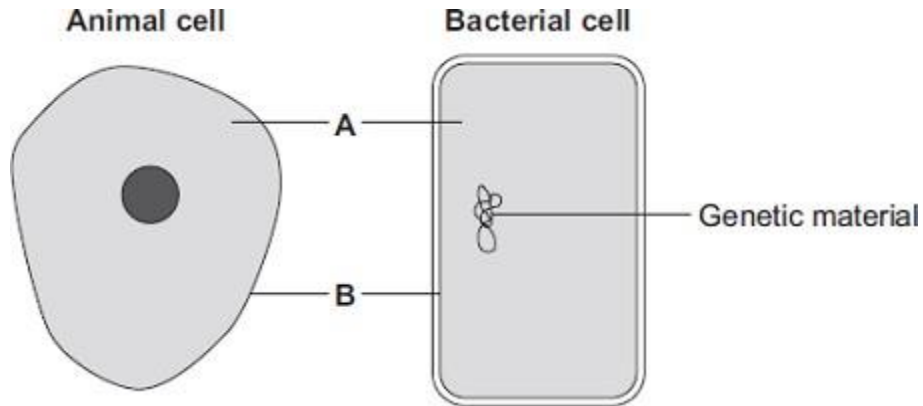
3. _____

(3)

(Total 6 marks)

10

The diagrams show an animal cell and a bacterial cell.



(a) (i) Structures **A** and **B** are found in both the animal cell and the bacterial cell.

Use words from the box to name structures **A** and **B**.

cell membrane	chloroplast	cytoplasm	vacuole
---------------	-------------	-----------	---------

A _____

B _____

(2)

(ii) Both cells contain genetic material.

Name the structure in the animal cell that contains genetic material.

(1)

(b) **List A** gives three structures found in animal cells.

List B gives four functions of cell structures.

Draw **one** line from each structure in **List A** to its correct function in **List B**.

List A – Structure

Cell membrane

Mitochondrion

Ribosome

List B – Function

Controls what substances enter the cell

Photosynthesis

Protein synthesis

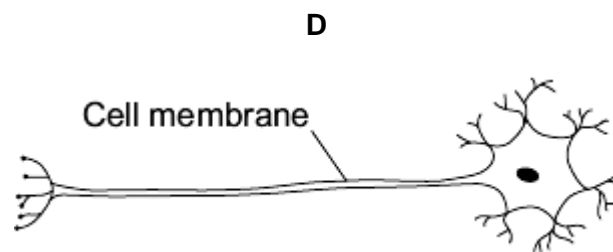
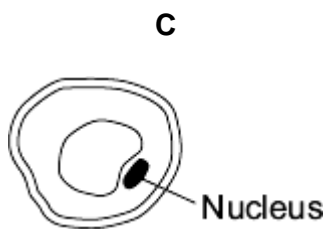
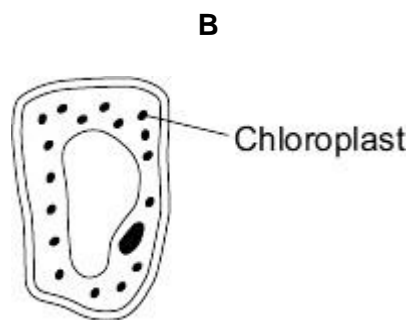
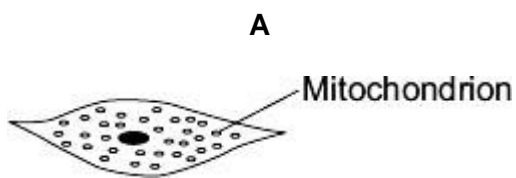
Respiration

(3)

(Total 6 marks)

11

The diagrams show four cells, **A**, **B**, **C** and **D**.



Use letters **A**, **B**, **C** or **D** to answer these questions.

(a) Which cell can photosynthesise?

(1)

(b) Which cell is adapted for receiving and sending information?

(1)

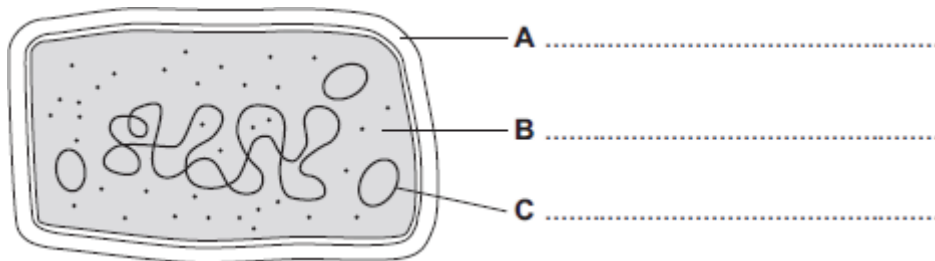
(c) Which cell is adapted to respire quickly?

(1)

(Total 3 marks)

12

(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
---------------	-----------	-------------	-----------	---------

(3)

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

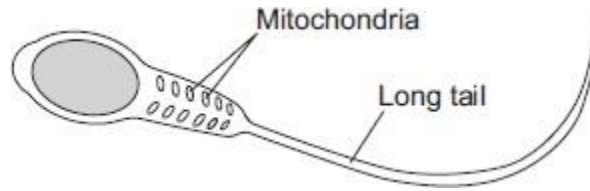
(1)

(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)

Mark schemes

1 (a) (i) capillary 1

(ii) diffusion 1

(iii)

Carbon dioxide	low(er)	high(er)
----------------	---------	----------

 1

Oxygen	high(er)	low(er)
--------	----------	---------

1 mark for each correct row 1

(b) (i) red blood cells 1

(ii) haemoglobin 1

[6]

2 (a) (i) C and D 1

(ii) cell wall 1

(b) (i) A 1

(ii) D 1

(c) respiration 1

[5]

3 (a) (i) root hair 1

(ii) any **two** from:

ignore food

- water
- ions / minerals / nutrients / salts / correct named eg nitrates
ignore N,P,K
- oxygen

2

(b) (i) stomata

1

(ii) diffusion

1

[5]

4

(a) (i) A cytoplasm

accept clear indications

1

B nucleus

1

(ii) any **two** from:

two required for **1** mark

- P
- R
- T

accept lower case letters

1

(b) sperm cells need a lot of energy to swim

1

[4]

5

(a) (i) (cell) membrane

1

(ii) vacuole

1

(b) any **two** from:

- (cell) wall
- chloroplast(s)
ignore chlorophyll

- vacuole
ignore cell sap

2

(c) diffusion

1

[5]

6

(a) (i) diffusion

1

(ii) A

1

(b) (i) osmosis

1

(ii) R

1

[4]

7

(a) (i) diffusion

apply list principle

1

(ii) A

apply list principle

1

(b) (i) osmosis

apply list principle

1

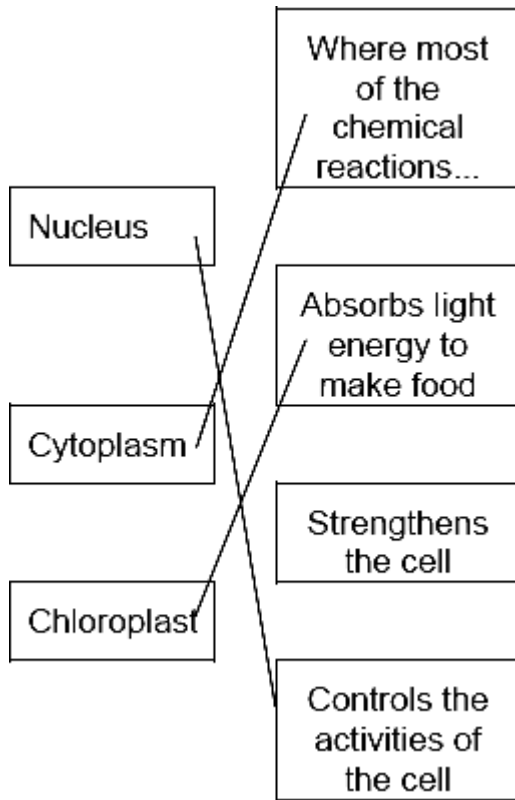
(ii) R

apply list principle

1

[4]

8 (a)



1 mark for each correct line
mark each line from left hand box
two lines from left hand box cancels mark for that box

3

(b) energy

1

[4]

9 (a)

comparisons are **not** required but should be credited
accept a clear indication of the statement even if incomplete

can develop into most other types of cell

1

each cell divides every 30 minutes

1

low chance of rejection by the patient's immune system

1

(b) any **three** from:

- cheaper / only costs £1000
*this **must** be comparative*
ignore costs £1000
- can collect many (stem) cells
- adults give permission for their own bone marrow to be collected
comparisons are not required but should be credited
- safe

3

[6]

10

(a) (i) A = cytoplasm

1

B = (cell) membrane

1

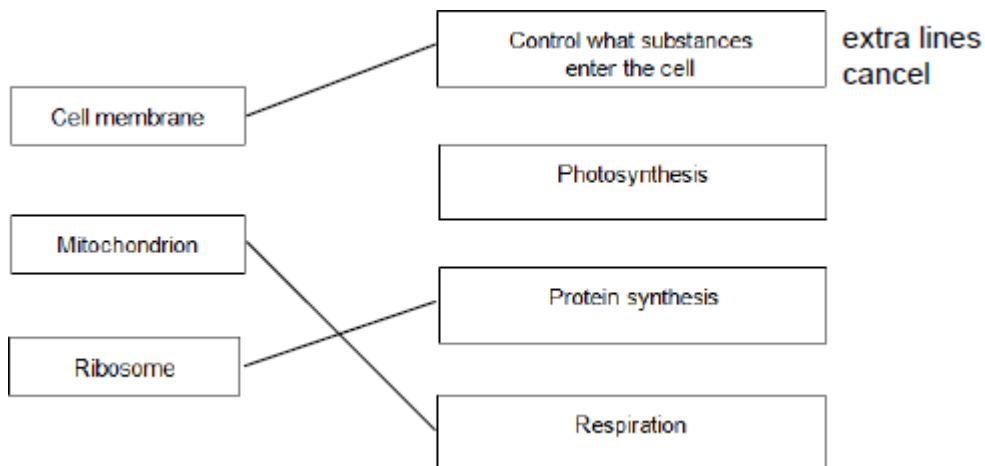
(ii) nucleus

accept chromosome / DNA / genes

accept phonetic

1

(b)



3

[6]

11

(a) B

1

(b) D

1

(c) A

1

[3]

12	(a) (i) A – (cell) wall	1
	B – cytoplasm	1
	C – plasmid	1
	(ii) bacterium cell has cell wall / no nucleus / no mitochondria / plasmids present <i>accept its DNA / genetic material is not enclosed / it has no nuclear membrane</i> <i>it = bacterium cell</i> <i>accept converse for animal cell</i> <i>ignore flagella</i>	1
	(iii) any one from:	
	• chloroplast <i>ignore chlorophyll</i>	
	• (permanent) vacuole	1
	(b) (Long tail) moves the sperm / allows the sperm to swim	1
	towards the egg <i>allow correct reference to other named parts of the female reproductive system</i>	1
	(Mitochondria) release <u>energy</u> (for movement / swimming) <i>allow supply / produce / provide</i>	1
	in respiration	1

[9]