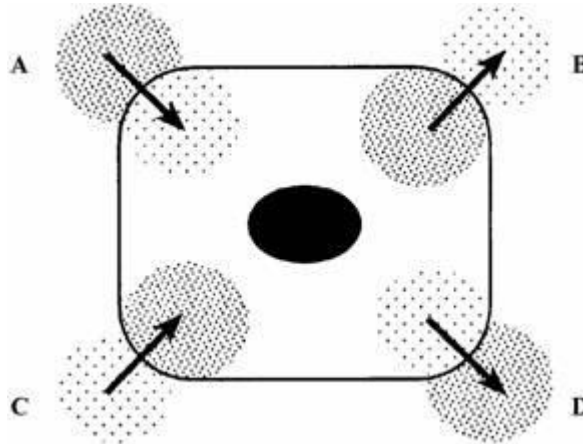


- 1 (a) The diagram shows four ways in which molecules may move into and out of a cell. The dots show the concentration of molecules.



The cell is respiring aerobically.
Which arrow, **A**, **B**, **C** or **D**, represents:

- (i) movement of oxygen molecules; _____
(ii) movement of carbon dioxide molecules? _____

(2)

- (b) Name the process by which these gases move into and out of the cell.

(1)

- (c) Which arrow, **A**, **B**, **C** or **D**, represents the active uptake of sugar molecules by the cell?

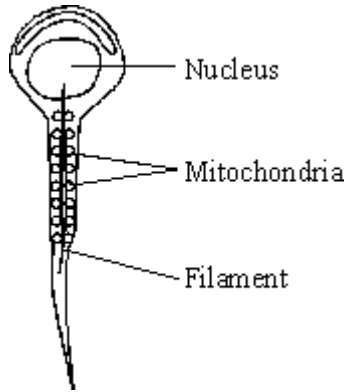
Explain the reason for your answer.

(2)

(Total 5 marks)

2

The diagram shows a human sperm. Inside the tail of the sperm is a filament mechanism that causes the side to side movement of the tail, which moves the sperm.



(a) Describe the function of the mitochondria and suggest a reason why they are arranged around the filament near the tail of the sperm.

(3)

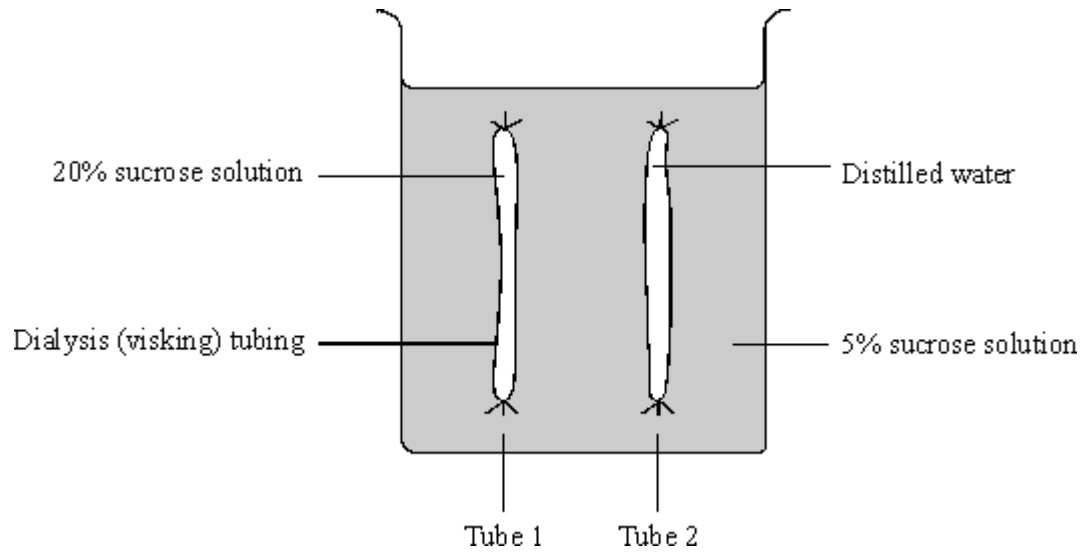
(b) Explain the significance of the nucleus in determining the characteristics of the offspring.

(2)

(Total 5 marks)

3

Some students set up this experiment to investigate osmosis. They filled two pieces of dialysis [visking] tubing with different liquids and left them both in a beaker of 5% sucrose solution for an hour.



(a) Describe and explain the likely results after one hour.

(6)

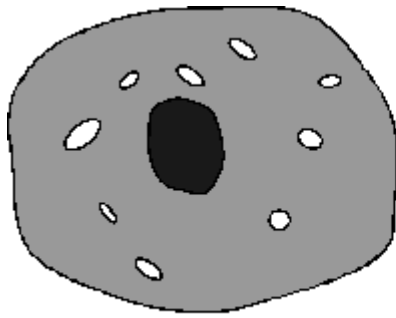
(b) Describe **two** examples where osmosis is used in living things.

(2)

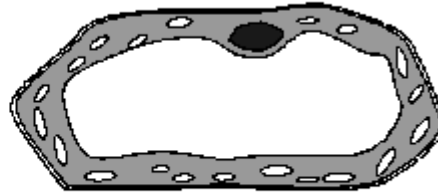
(Total 8 marks)

4

The diagrams show a cheek cell from a human and a leaf cell from a plant.



Cheek cell



Leaf cell

(a) The two cells have a number of parts in common.

(i) On the cheek cell, label **three** of these parts which both cells have.

(3)

(ii) In the table, write the names of the **three** parts you have labelled above and describe the main function of each part.

Part	Function

(3)

(b) Blood contains white cells and red cells. State the function of each type of cell in the blood.

White cells _____

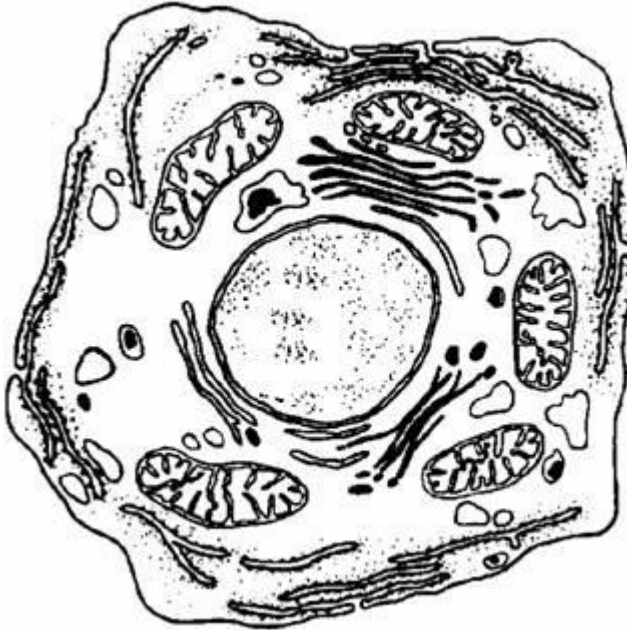
Red cells _____

(2)

(Total 8 marks)

5

The drawing shows an animal cell, seen at a very high magnification using an electron microscope.



(a) (i) Label a mitochondrion [plural = mitochondria].

(1)

(ii) What happens in the mitochondria?

(1)

(b) (i) Name and label the structure where you would find chromosomes.

(1)

(ii) What are chromosomes made of?

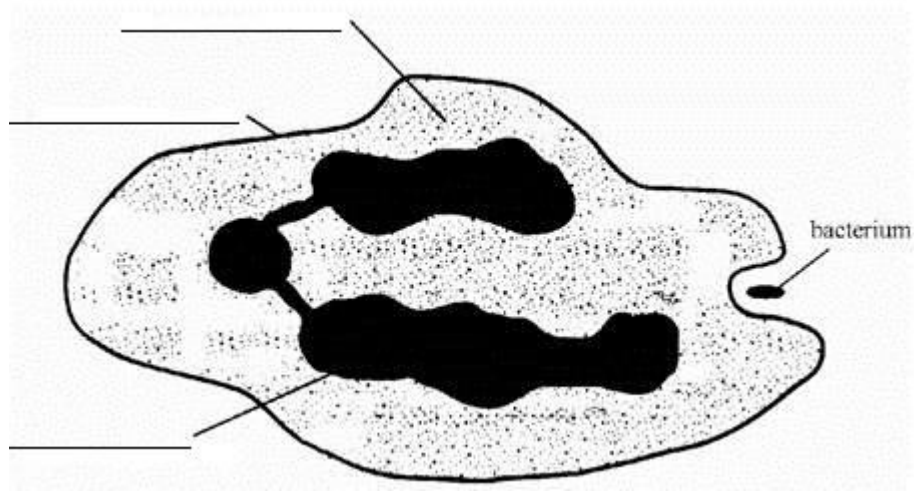
(1)

(c) What controls the rate of chemical reactions in the cytoplasm?

(1)

(Total 5 marks)

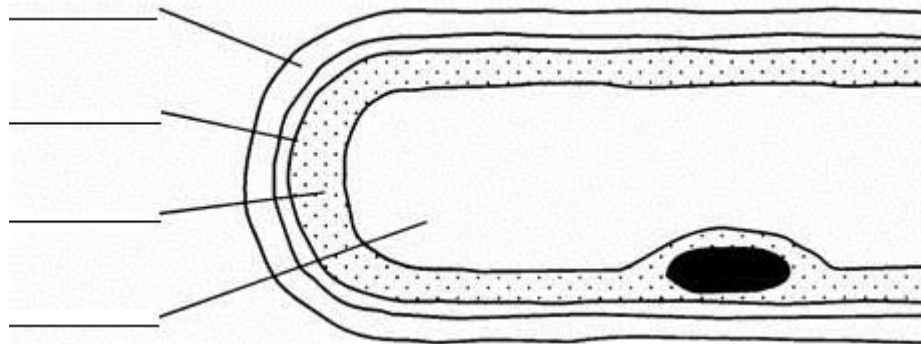
6 The drawing shows a white blood cell ingesting a bacterium.



Label the parts of the white blood cell.

(Total 3 marks)

7 The drawing shows part of a root hair cell.

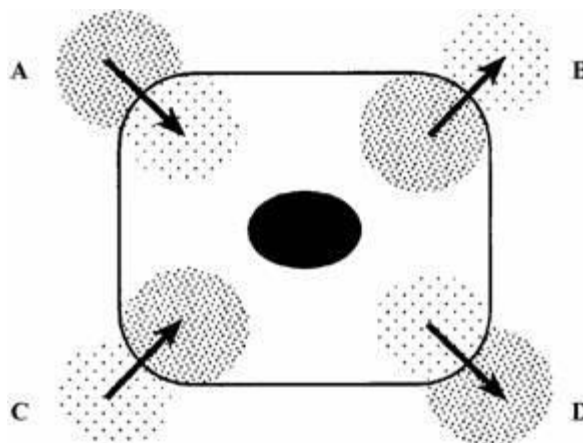


(a) Use words from the list to label the parts of the root hair cell.

cell membrane cell wall cytoplasm nucleus vacuole

(4)

(b) The diagram shows four ways in which molecules may move into and out of a cell. The dots show the concentration of molecules.



The cell is respiring aerobically.
Which arrow, **A**, **B**, **C** or **D** represents:

(i) movement of oxygen molecules; _____

(ii) movement of carbon dioxide molecules? _____

(2)

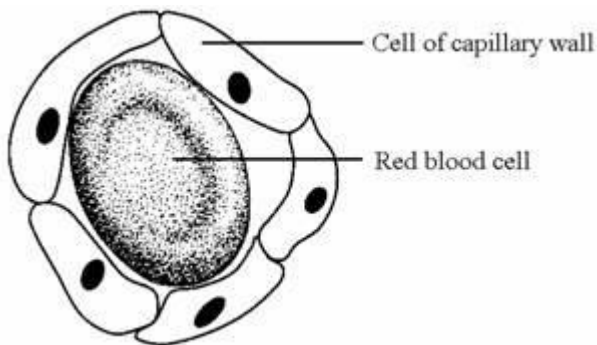
(c) Name the process by which these gases move into and out of the cell.

(1)

(Total 7 marks)

8

Capillaries are blood vessels in the body which join the arteries to the veins. They have walls which are one cell thick and so are able to exchange substances with the body cells.



(i) Name **two** substances that travel from the muscle cells to the blood in the capillaries.

1. _____

2. _____

(2)

(ii) Glucose is one substance that travels from the blood in the capillaries to the body cells. Explain how this happens.

(2)

(Total 4 marks)

Mark schemes

- 1** (a) (i) A
(ii) B
for 1 mark each 2
- (b) diffusion
(reject osmosis)
for one mark 1
- (c) C
because uptake against a concentration / diffusion gradient
(reject osmosis)
(if C not given, then idea of movement essential)
for 1 mark each 2

[5]

- 2** (a) **award one mark for each key idea**
- energy released **or** energy transferred **or** respiration
allow provides or gives
do not allow produces or makes 3
- near to the site of movement **or**
energy available quickly **or** more
energy
accept allows more mitochondria to fit in
- (mitochondria) packed (around
filament) **or** efficient arrangement **or**
spiral arrangement
- (b) contains chromosomes **or** genes **or**
DNA
not genetic material 1
- (which) contribute half (the genes) to
the fetus **or** offspring
23 chromosomes or half the genes
or reference to X, Y chromosome determining sex (if the notion of
halfness is there)
nucleus contains half genes for the offspring = 2 marks 1

[5]

- 3** (a) award **3** marks per tube for each key idea
for tube 1:
expands **or** gets firmer **or** bigger **or** inflates
it gains water

because the concentration of water is less than its surroundings
make sure answer is about water movement and not sucrose solution

3

for tube 2
gets floppy **or** flaccid **or** contracts
it loses water

because the concentration of water is greater than its surroundings

3

- (b) any **2** from:

uptake of water by root (hair) **or**
movement from cell to cell within
plant

*do **not** credit references to diffusion unless it is clear that the candidate is referring to the diffusion of water*

guard cell function

maintain turgor

water absorption in the large intestine

reabsorption of water from the
nephron **or** collecting duct or in
kidney **or** osmoregulation in kidney

allow osmosis in other animals if some use is shown

2

[8]

- 4 (a) (i) the three features correctly labelled on cheek cell (which are referred to in part (ii))

label lines should touch or end very close to part no marks if leaf cell labelled

nucleus

cytoplasm

cell membrane

mitochondrion

accept mitochondria or one of these could be labelled vacuole

3

- (ii) any **three** from

feature

function

nucleus

controls cell

*accept contains genetic material **or** genes **or** chromosomes **or** stores information*

do not credit the brain of the cell

cytoplasm

where respiration

occurs

*accept contains food **or** mitochondria*

or reactions occurs

membrane

less water **or**

chemicals

accept surrounds the cell or lets some things in but not others

*do not credit keeps things out **or** protection*

in and **or** out

mitochondria

where energy released

ecf from leaf cell labelling

*accept chloroplasts make sugar **or** glucose*

accept vacuole contains sap

*accept if cell wall mis labelled on cheek cell, support **or** hold together*

3

- (b) fight **or** ingest **or** kill bacteria **or** germs **or** viruses **or** microbes
accept produce antitoxins or antibodies fight disease (organisms)
do not credit fungus

1

(transport) oxygen **or** carry haemoglobin

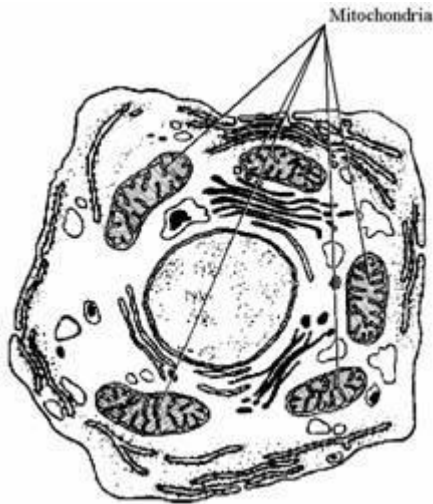
*accept transport carbon dioxide **or** helps form scabs*

1

[8]

5

- (a) (i)



award 1 mark for any of the mitochondria correctly labelled if a number are labelled and one is incorrect award 0 marks

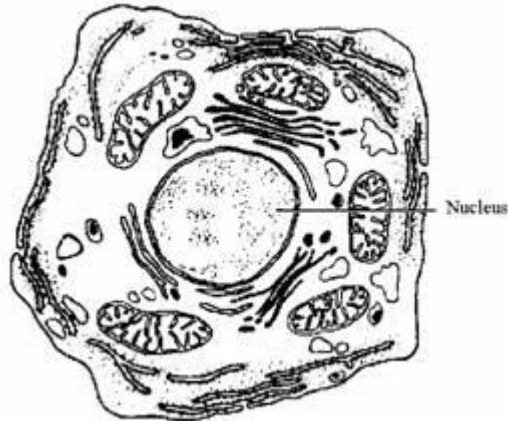
1

- (ii) respiration **or** the release **or** transfer of energy **or** it contains the enzymes for respiration

*do **not** accept energy produced*

1

- (b) (i) nucleus (named and correctly labelled)



arrow or line must touch or go inside the nuclear membrane

1

- (ii) DNA or genes or nucleic acids
accept protein or histones or nucleotides or ATGC

1

- (c) enzymes or nucleus

do not accept factors that affect the rate rather than control it eg pH or temperature

1

[5]

- 6 cytoplasm reject protoplasm
 (cell) membrane
 nucleus

*all correctly labelled
 each for 1 mark*

[3]

- 7 (a) (cell) wall
 (cell) membrane
 cytoplasm
 vacuole

for 1 mark each

4

- (b) (i) A
 (ii) B

for 1 mark each

2

- (c) diffusion (reject osmosis)
for 1 mark

1

[7]

- 8** (i) any **two** from:
- urea
 - carbon dioxide
 - water
 - lactic acid
- 2
- (ii) higher concentration of glucose **or** more glucose in blood than cells
- 1
- diffuses across
- 1

[4]