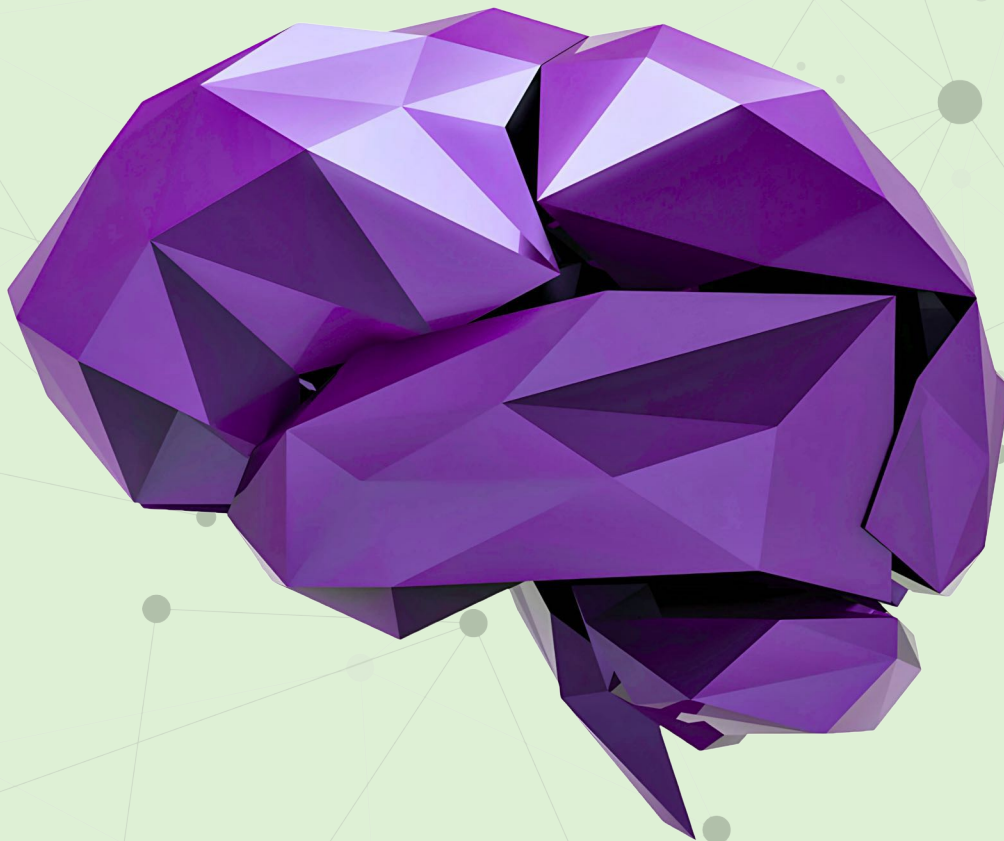


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1 Fig. 1.1 shows the movement of particles through an epithelial cell in the small intestine.

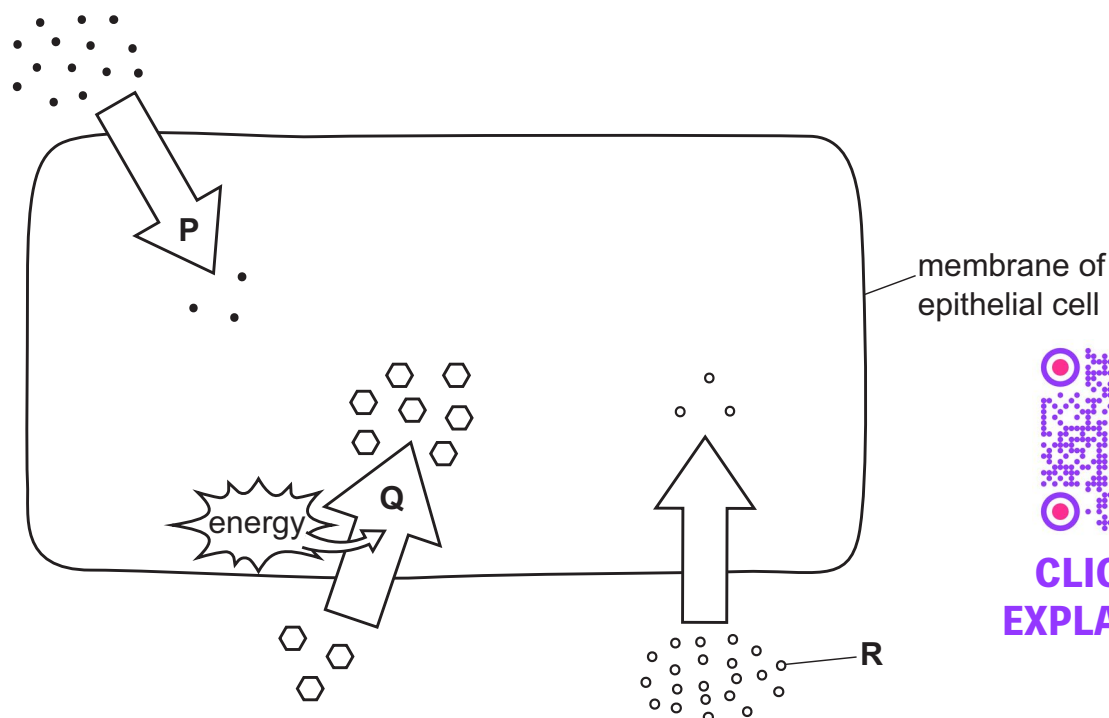


Fig. 1.1

(a) In Fig. 1.1, arrow **P** represents the diffusion of oxygen molecules.

(i) Describe what is meant by the term diffusion.

Diffusion is the of particles. It occurs from a region of to a region of This results from their

[2]

(ii) State the type of energy needed for diffusion.

[1]

(b) Carbon dioxide molecules also move by diffusion.

(i) State the name of the process in human cells that produces carbon dioxide.

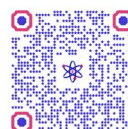
[1]

(ii) On Fig. 1.1, draw an arrow to show the direction of diffusion of carbon dioxide molecules.

[1]



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(c) In Fig. 1.1, arrow **Q** represents another type of particle movement.

Identify the type of particle movement represented by arrow **Q**.

Explain your answer.

type of movement

explanation

.....

.....

[3]

(d) In Fig. 1.1, particle **R** moves from the lumen of the small intestine into the epithelial cell.

Suggest why particle **R cannot** be starch.

Because starch is

and it's

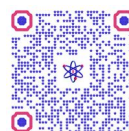
to move in or out of the cell

For starch to be transported, it must be

[2]



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(e) Fig. 1.2 is a photomicrograph of red onion cells.

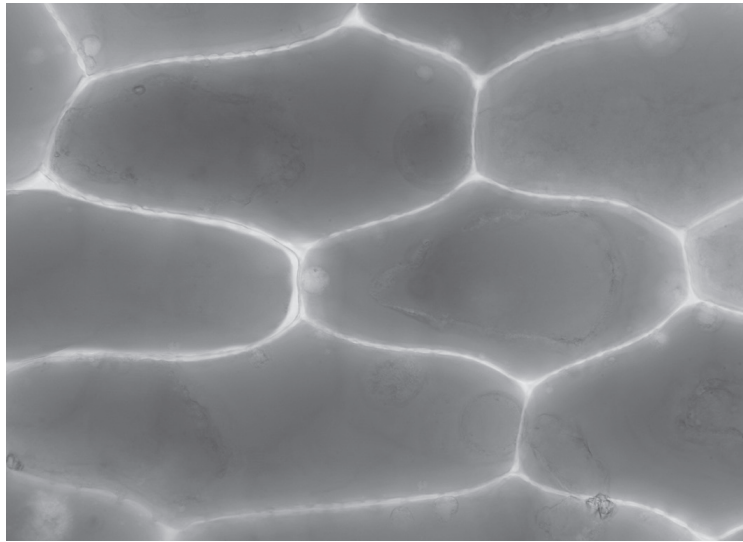


Fig. 1.2

Fig. 1.3 is a photomicrograph of the same red onion cells after being immersed in a salt solution.

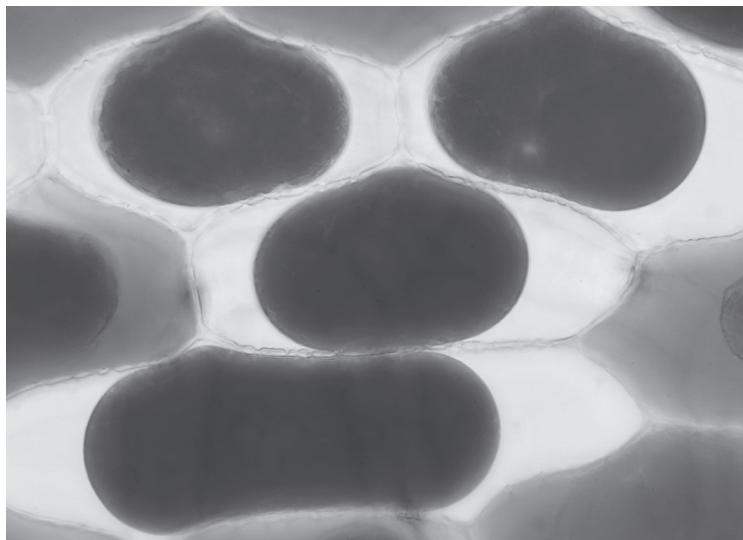
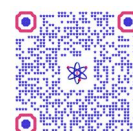


Fig. 1.3



Using Fig. 1.2 and Fig. 1.3, describe **and** explain the difference in appearance of the cells before and after immersion in salt solution.

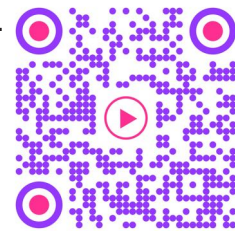
Before immersion, cells are as the cell membrane pushes against the creating .

After immersion, cells become and the cell membrane from the cell wall, resulting in .

This causes water to flow by from the with to the salt solution through .

[6]

[Total: 16]



**CLICK FOR
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- 2 (a) The internal body temperature of a person was recorded.

Fig. 2.1 shows the results.

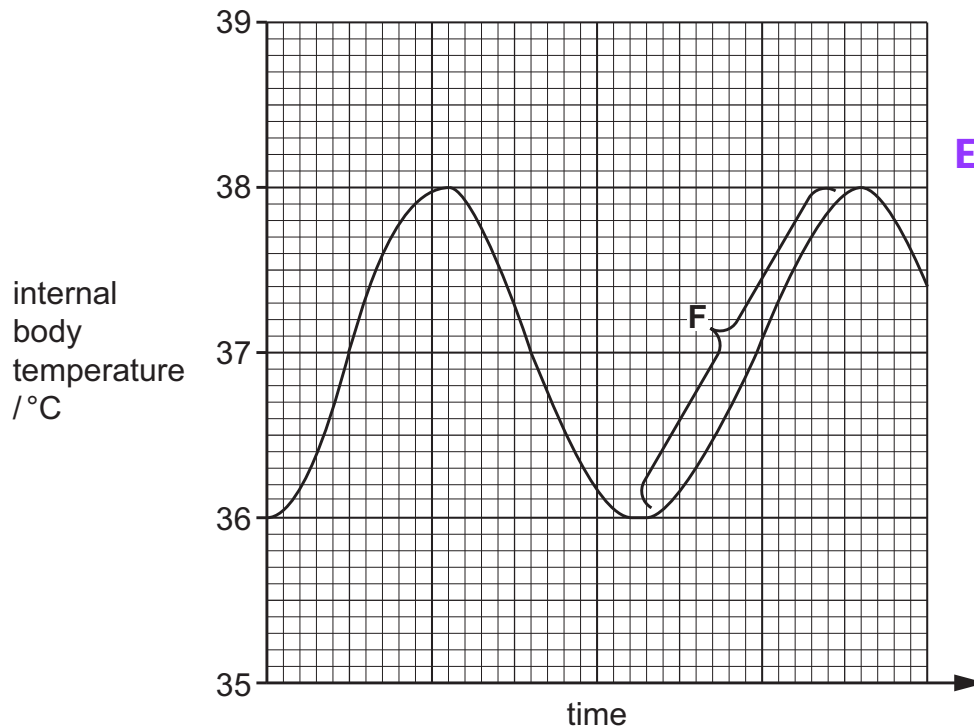


Fig. 2.1

- (i) Using the information in Fig. 2.1, calculate the temperature range for the internal body temperature of the person.

State the units.

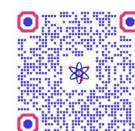
..... [1]

- (ii) On Fig. 2.1, draw a line to show the set point for the internal body temperature of the person. [1]

- (iii) The maintenance of internal body temperature is an example of homeostatic control.

State the name of the mechanism for homeostatic control.

..... [1]



(iv) On Fig. 2.1, region **F** shows a change in body temperature.

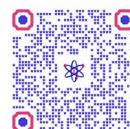
Explain how the body causes the change in body temperature shown.

As the temperature increases, the detects low temperature. of occurs. There is less blood flow to the skin surface or . Energy is retained or prevents . happens.

[5]



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(b) Fig. 2.2 shows a cross-section of human skin.

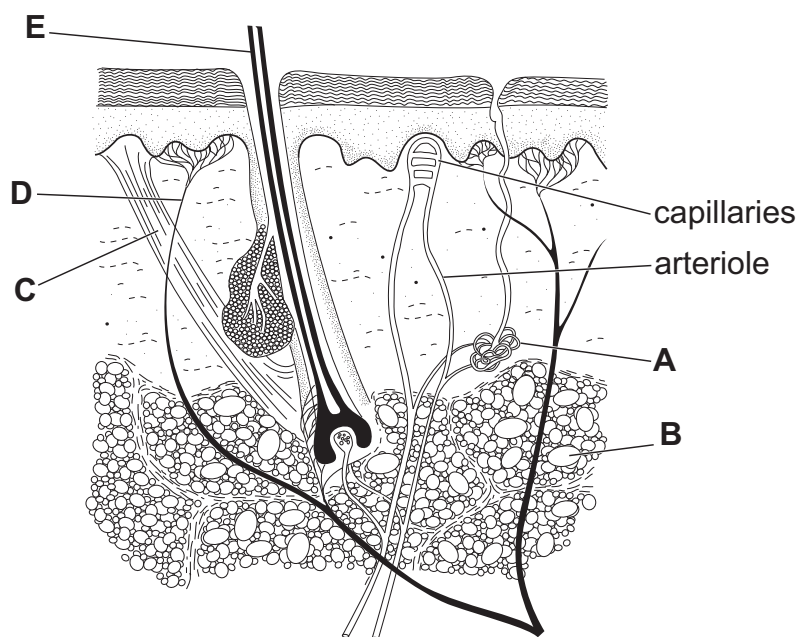


Fig. 2.2

(i) State the letter of the structure shown in Fig. 2.2 that produces sweat.

..... [1]

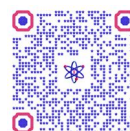
(ii) State the names of structures **C** and **D** shown in Fig. 2.2.

C

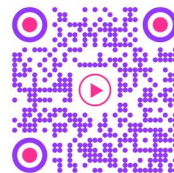
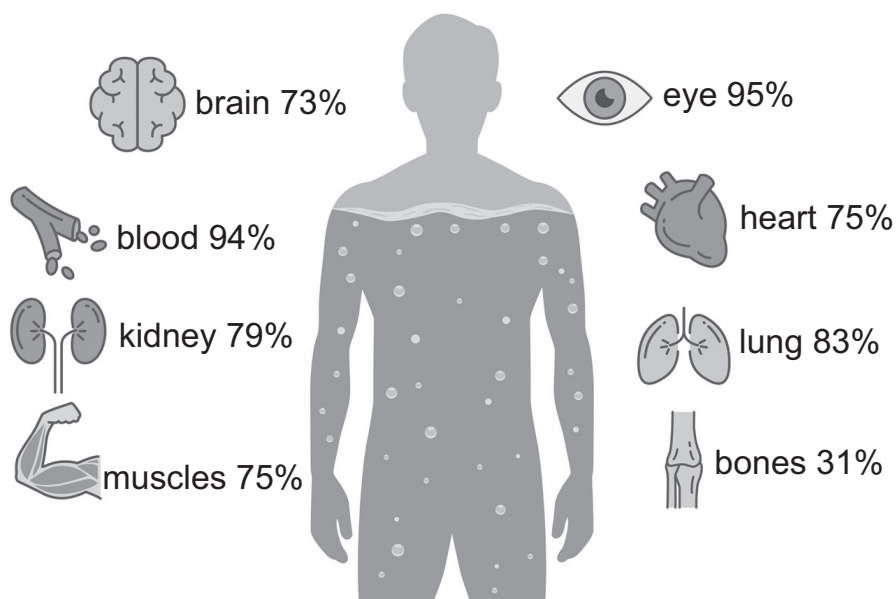
D

[2]

[Total: 11]



- 3 (a) Fig. 3.1 shows the percentage of water in different structures of the human body.



CLICK FOR EXPLANATION

Fig. 3.1

- (i) The mean mass of a human eye is 28 g.

Using information from Fig. 3.1, calculate the mass of water in a human eye.

Give your answer to **two** significant figures.

..... g
[2]

- (ii) Describe the importance of water in the human body.

Water is where take place

It is necessary to regulate body

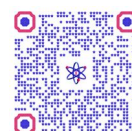
Water is needed for

And is necessary for

..... [3]



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- (b) Cholera is a disease caused by a pathogen in contaminated water.

Fig. 3.2 is a diagram of the cholera pathogen.

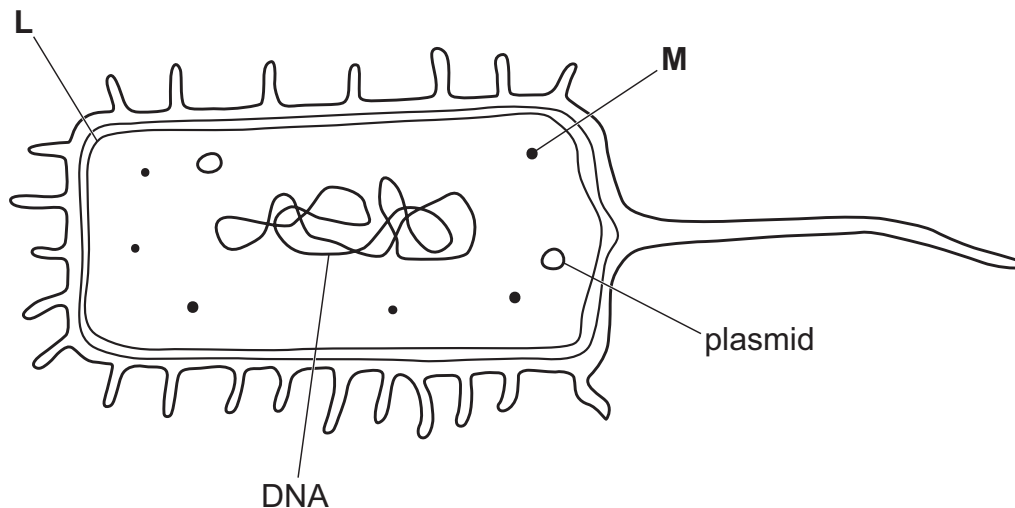


Fig. 3.2

- (i) State the name of structures **L** and **M** shown in Fig. 3.2.

L

M [2]

- (ii) Identify **two** features shown in Fig. 3.2 that are typical of prokaryotes.

1

2 [2]

- (iii) State the type of pathogen that causes cholera.

..... [1]

- (iv) The scientific name for the pathogen that causes cholera is *Vibrio cholerae*.

State the genus name for this pathogen.

..... [1]



- (v) Explain how the cholera pathogen causes dehydration of the human body.

The organism produces a This toxin
causes the secretion of into
the small intestine or gut. Water moves to
the gut by . This results in

[3]

- (vi) Complete the sentences about the use of plasmids in genetic modification.

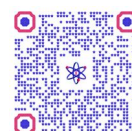
During genetic modification, human DNA and plasmid DNA are cut with a
restriction enzyme. This creates which are joined together
using an enzyme called The modified plasmid containing
the human gene is called a plasmid.

[3]

[Total: 17]



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- 4 (a) Fig. 4.1 shows part of a human placenta and umbilical cord. The arrows show the direction of blood flow.

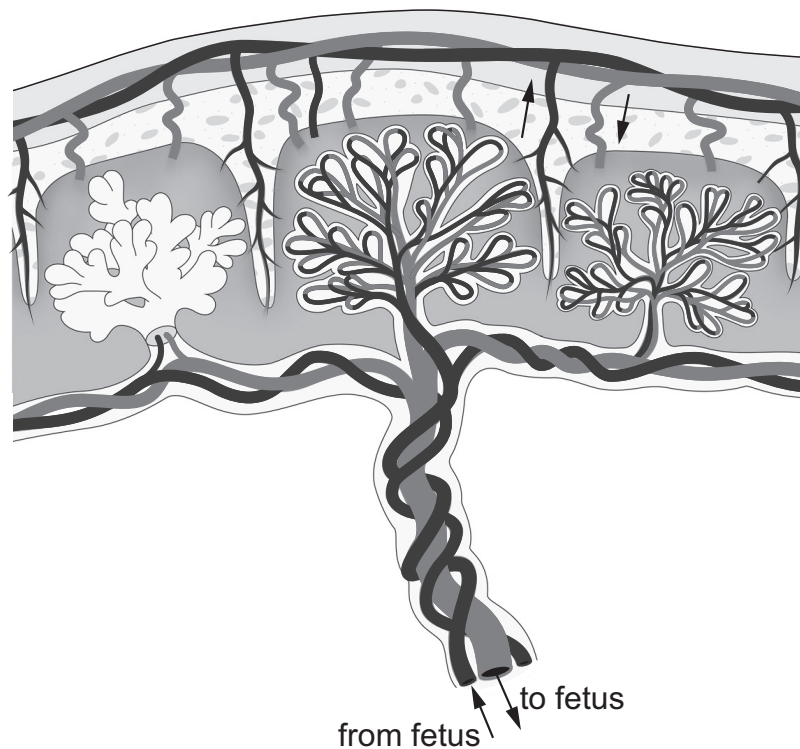


Fig. 4.1

- (i) Describe the functions of the placenta and the umbilical cord shown in Fig. 4.1.

The placenta is the site of It

acts as a to

It separates maternal and fetal

The umbilical cord the fetus to

the mother mother's

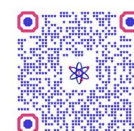
and are

transported to the

and in the opposite

direction

[4]



- (ii) A fetus develops inside an amniotic sac.

Describe the functions of the amniotic sac and amniotic fluid.

The sac and amniotic fluid.
This fluid acts as a It helps
 the temperature of the fetus. The
fluid allows the fetus to which
supports
.....
..... [3]

- (b) Syphilis is a sexually transmitted infection (STI) that can be passed from a mother to her fetus.

- (i) State the name of **one** other STI that can be passed from mother to fetus.

..... [1]

- (ii) State **two** ways to control the spread of STIs.

1

2 [2]

[Total: 10]



5 (a) Fig. 5.1 shows a cross-section of a leaf.

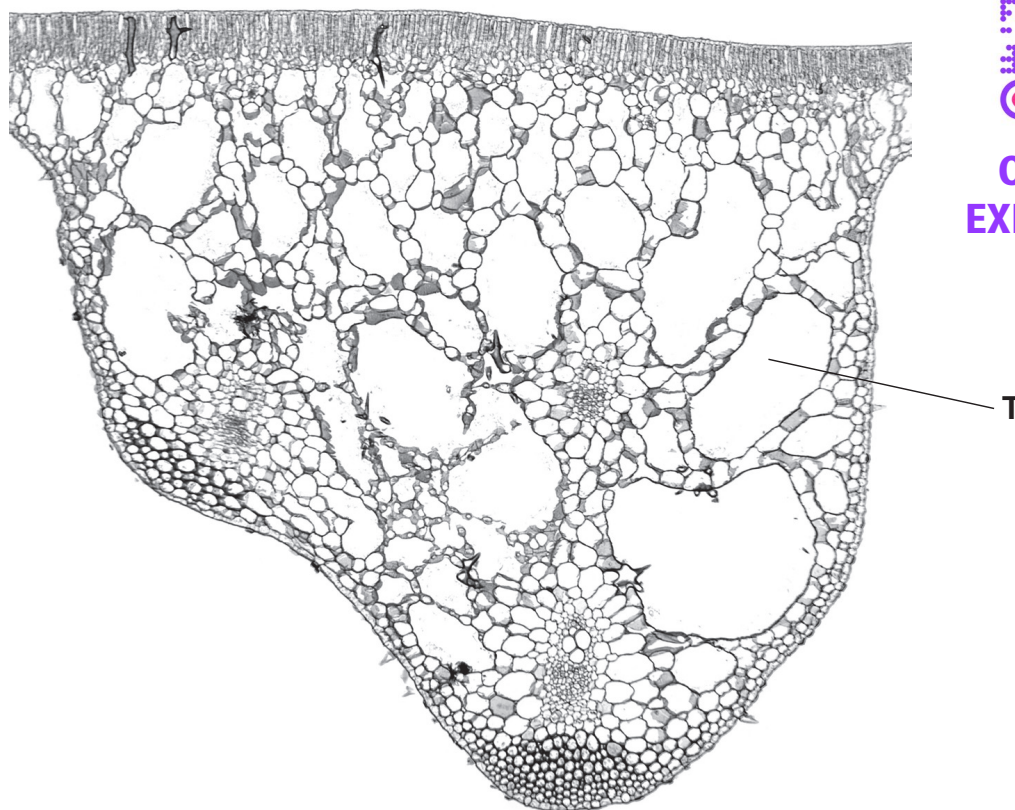


Fig. 5.1

- (i) On Fig. 5.1, draw a circle around **one** vascular bundle. [1]
- (ii) On Fig. 5.1, draw a label line and the letter **X** to identify the palisade mesophyll tissue. [1]
- (iii) State the name of the cell structure in palisade mesophyll cells where photosynthesis occurs.
..... [1]
- (iv) Describe the functions of the tissues in a vascular bundle in a leaf.

..... transports and
 from to the to by
 transport and from
 the to the , it is also
 necessary for



(b) The leaf shown in Fig. 5.1 is from an aquatic plant adapted to live in water. The leaves float on the surface of the water.

(i) State the term used to describe plants that are adapted to live in water.

..... [1]

(ii) Identify feature **T** shown in Fig. 5.1 **and** explain how this feature adapts the leaf to float on the surface of the water.

feature **T**

explanation

..... [2]

(iii) Explain **one** other adaptation of this group of aquatic plants.

on the upper epidermis

For

[2]

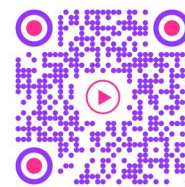
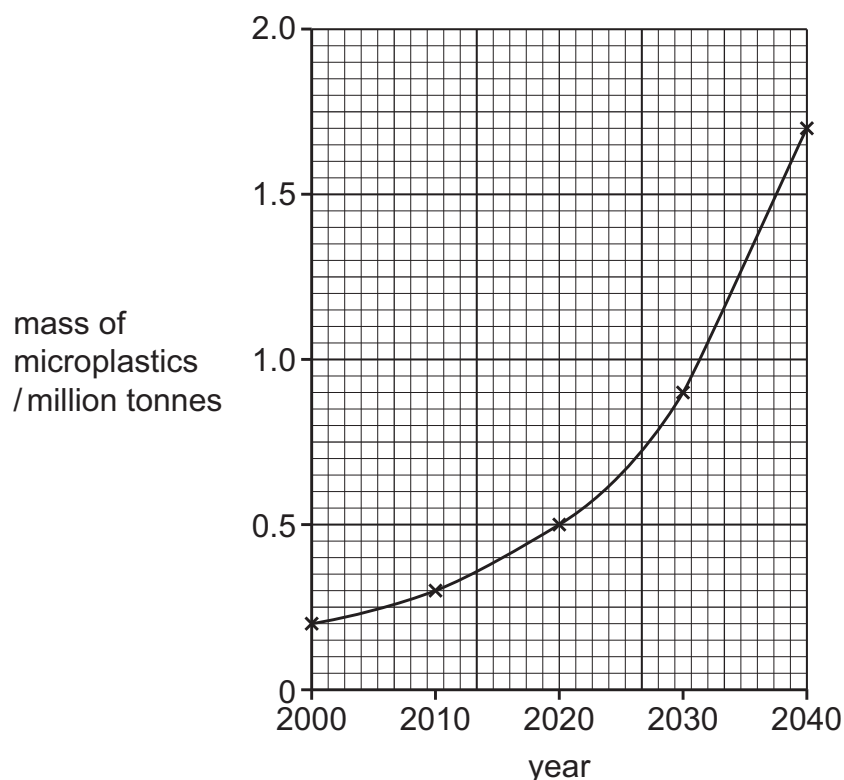
No need to

[Total: 12]



- 6 (a) Microplastics are pieces of plastic with a diameter less than 0.5 cm.

Fig. 6.1 shows the mass of microplastics in the oceans between 2000 and 2040. The data between 2000 and 2020 is an estimate. The data after 2020 is a prediction.



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Fig. 6.1

- (i) Suggest why the mass of microplastics between 2000 and 2020, shown in Fig. 6.1, is an estimate.

.....

.....

.....

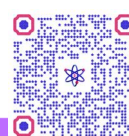
.....

..... [2]

- (ii) Using Fig. 6.1, calculate the predicted percentage increase in the mass of microplastics in the oceans between 2000 and 2040.

Space for working.

..... %
[2]



(b) Phytoplankton are producers found in the ocean. Phytoplankton absorb microplastics into their cells.

(i) Describe what is meant by the term producer.

.....

.....

.....

.....

..... [2]

(ii) Fig. 6.2 shows a shearwater bird.

Shearwater birds feed on fish in the ocean.



Fig. 6.2

Suggest how microplastics can end up in consumers such as shearwater birds.

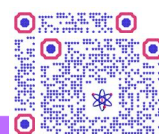
.....

.....

.....

.....

..... [2]



(iii) The population of shearwater birds is decreasing.

Describe **three** ways the population of shearwater birds can be conserved.

1

.....

2

.....

3

.....

[3]

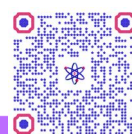
(iv) Explain the risks to a population if its population size decreases.

A reduction in leads to an
increased chance of which
results in less and chance of
.....

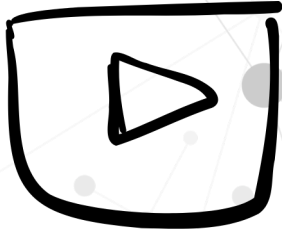
It also results in a higher chance of [3]
..... being expressed leading to

[Total: 14]

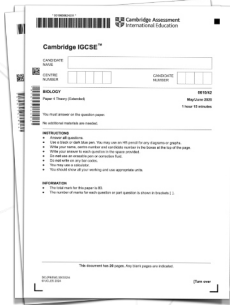
.....



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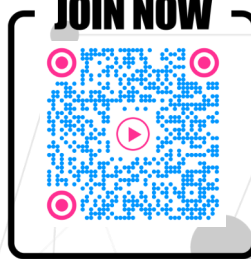


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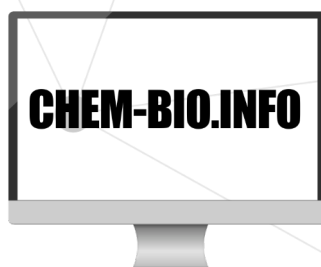
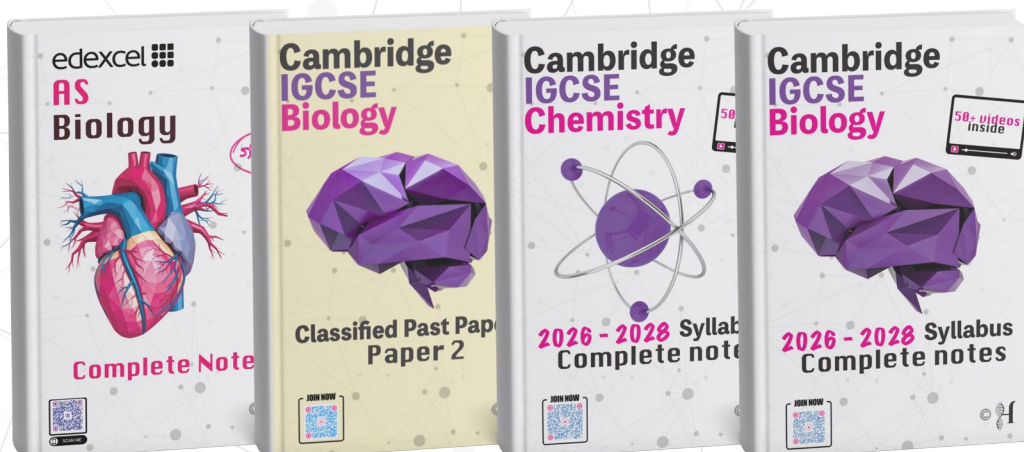


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