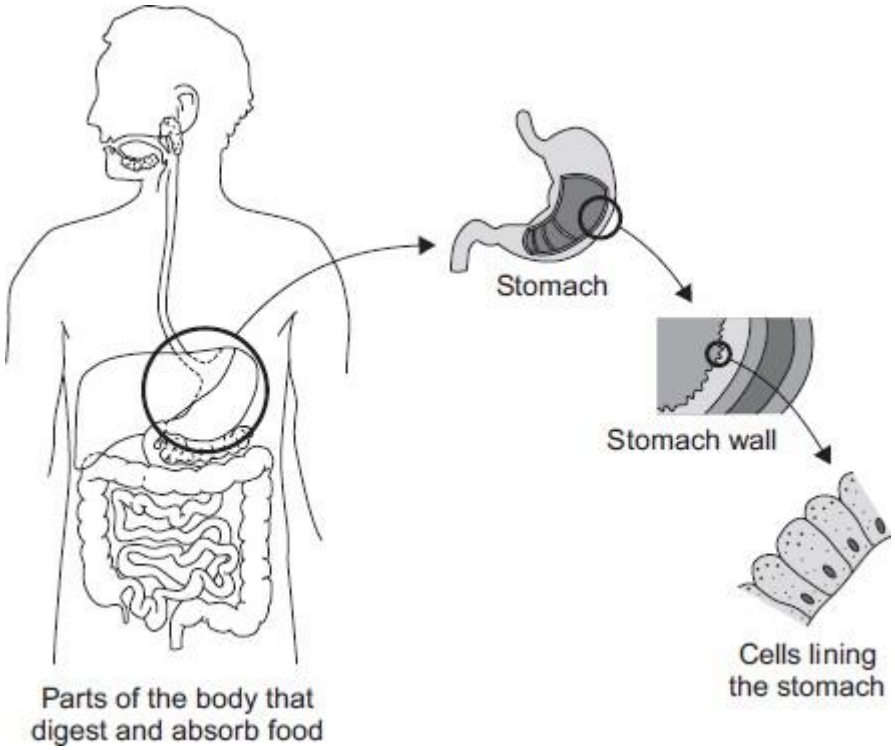
1 The diagram below shows the parts of the body that digest and absorb food.

It also shows some details about the structure of the stomach.



(a) Complete the table to show whether each structure is an organ, an organ system or a tissue.

For each structure, tick (✓) **one** box.

Structure	**Organ**	**Organ system**	**Tissue**
Stomach			
Cells lining the stomach			
Mouth, oesophagus, stomach, liver, pancreas, small and large intestine			

(2)

(b) (i) The blood going to the stomach has a high concentration of oxygen.
The cells lining the stomach have a low concentration of oxygen.

Complete the following sentence.

Oxygen moves from the blood to the cells lining the stomach by

the process of _____.

(1)

(ii) What other substance must move from the blood to the cells lining the stomach so that respiration can take place?

Draw a ring around the correct answer.

glucose **protein** **starch**

(1)

(iii) In which part of a cell does aerobic respiration take place?

Draw a ring around the correct answer.

cell membrane **mitochondria** **nucleus**

(1)

(Total 5 marks)

2 Substances are transported through plants.

(a) Use the correct answer from the box to complete each sentence.

capillary	**guard cells**	**phloem**
stomata	**transpiration**	**xylem**

(i) Water is transported from the roots to the stem of a plant

in the _____.

(1)

(ii) Dissolved sugars are transported through the plant

in the _____.

(1)

(iii) Movement of water through the plant is called the

_____stream.

(1)

(iv) Water vapour moves out of the plant through pores

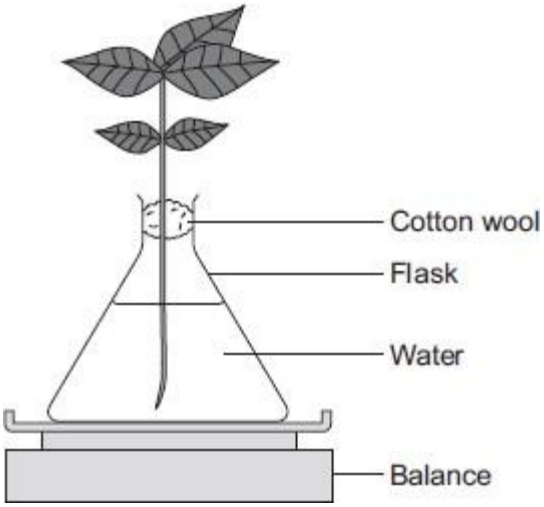
called _____.

(1)

(b) Students investigated the effect of different conditions on water loss from leaves.

The apparatus is shown in **Figure 1**.

Figure 1



The students set up four flasks, **A**, **B**, **C** and **D**.

The students:

- used the same size plant shoot in each flask
- recorded the mass of the flask and plant shoot at the start of each experiment
- left each flask and plant shoot in different conditions
- recorded the mass of each flask and plant shoot after 2 hours.

Table 1 shows the conditions that flasks **A**, **B**, **C** and **D** were left in for 2 hours.

Table 1

Flask	Temperature in °C	Fan or no fan
A	20	No Fan
B	20	Fan
C	35	No Fan
D	35	Fan

(i) Suggest why the students used cotton wool in each flask.

_____

_____

(1)

(ii) The use of the same size of plant shoot made the investigation a fair test.

Explain why.

_____

_____

_____

_____

_____

(2)

(iii) **Table 2** shows the students' results.

Table 2

Flask	Conditions		Mass at the start in grams	Mass after 2 hours in grams	Mass of water lost in 2 hours in grams
	Temperature in °C	Fan or no fan			
A	20	No Fan	150.0	148.1	1.9
B	20	Fan	152.0	148.5	3.5
C	35	No Fan	149.0	145.9	3.1
D	35	Fan	150.0	145.5	

What mass of water was lost by the plant shoot in flask **D**?

_____

_____

_____grams

(1)

(iv) Suggest what conclusion can be made about the effect of temperature on water loss from the plant shoot.

_____

_____

_____

(1)

(v) Suggest what conclusion can be made about the effect of the fan on water loss from the plant shoot.

_____

_____

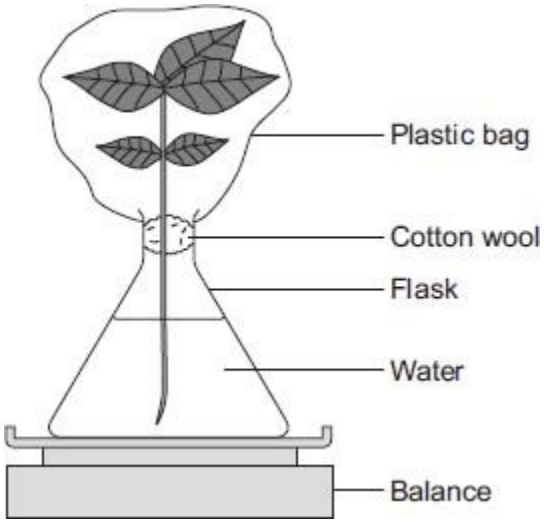
_____

(1)

(c) The students carried out another experiment at 20 °C, with no fan.

The students used the apparatus in **Figure 2**.

Figure 2



In this experiment, the students:

- recorded the mass of the flask and plant shoot before tying the plastic bag around the plant shoot
- removed the bag after 2 hours and recorded the mass again.

(i) What mass of water would be lost from the plant shoot in 2 hours?

Draw a ring around the correct answer.

0.3 g **1.9 g** **3.9 g**

(1)

(ii) Give a reason for your answer to part **(c)(i)**.

_____

_____

_____

(1)

(Total 12 marks)

3 Denim jeans can be coloured with blue dye. The dye joins onto the fibres of the material. Some people like their denim jeans to look faded. The faded look is called 'stonewashed'. There are two different ways to make denim material look faded.

Traditional stonewashing

- Denim material is put in a slowly spinning container with large stones.
- Very hot water is added.
- Washing takes up to five hours.
- Washing breaks some of the fibres and lets the dye come out from the fibres.
- Washing will work with any dye.

Bio-stonewashing

- Denim material is washed with enzymes in warm water.
- Washing takes half an hour.
- The enzymes let the dye come out from the fibres.
- Different enzymes are needed for different dyes.
- The enzymes are expensive.
- After treatment the enzymes have to be removed from the denim.

(a) Use **only** the information above to answer these questions.

(i) Suggest **two** advantages of using the bio-stonewashing method instead of the traditional stonewashing method.

1. _____

_____

2. _____

_____

(2)

(ii) Suggest **two** disadvantages of using the bio-stonewashing method instead of the traditional stonewashing method.

1. _____

_____

2. _____

_____

(2)

(b) Some blue dyes are made of protein.

What type of enzyme would be used to remove these blue dyes from denim?

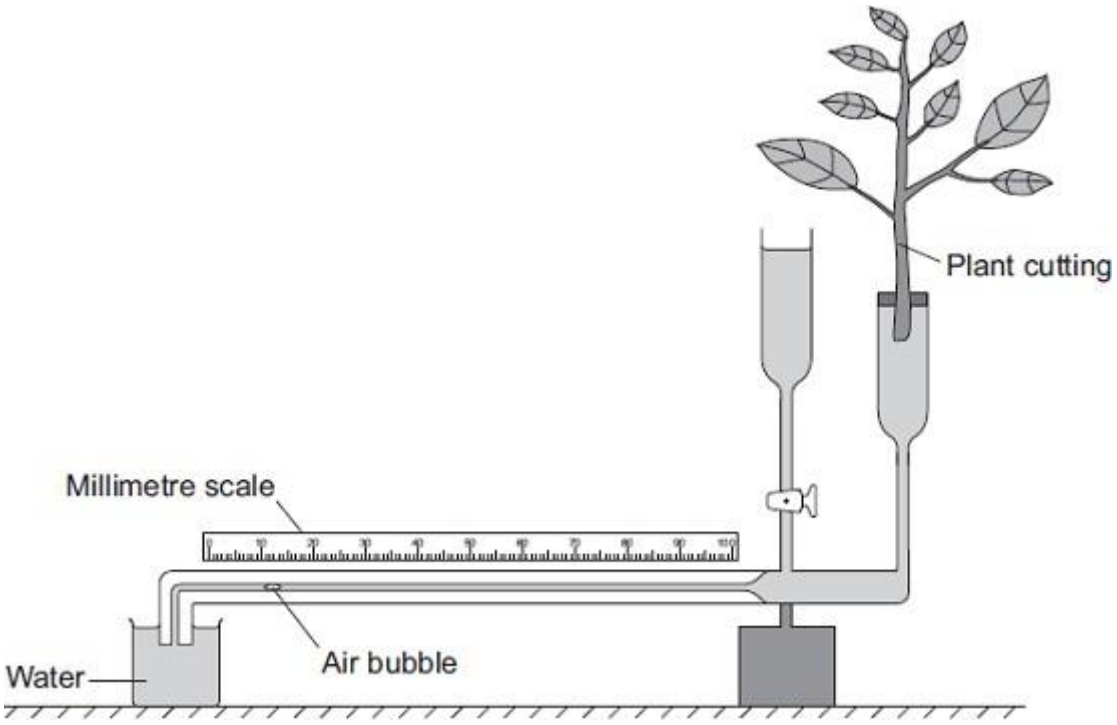
Draw a ring around **one** answer.

carbohydrase **lipase** **protease**

(1)

(Total 5 marks)

4 Some students used the apparatus shown in the diagram to measure the rate of water uptake by a plant cutting.



The students set up the apparatus in three different conditions:

- no wind at 15°C
- no wind at 25°C
- wind at 25°C

For each experiment, the students recorded the movement of the air bubble along the scale.

(a) (i) Name the **two** variables the students chose to change in these experiments.

1. _____

2. _____

(2)

(ii) It was important to use the same plant cutting each time to make these experiments fair.

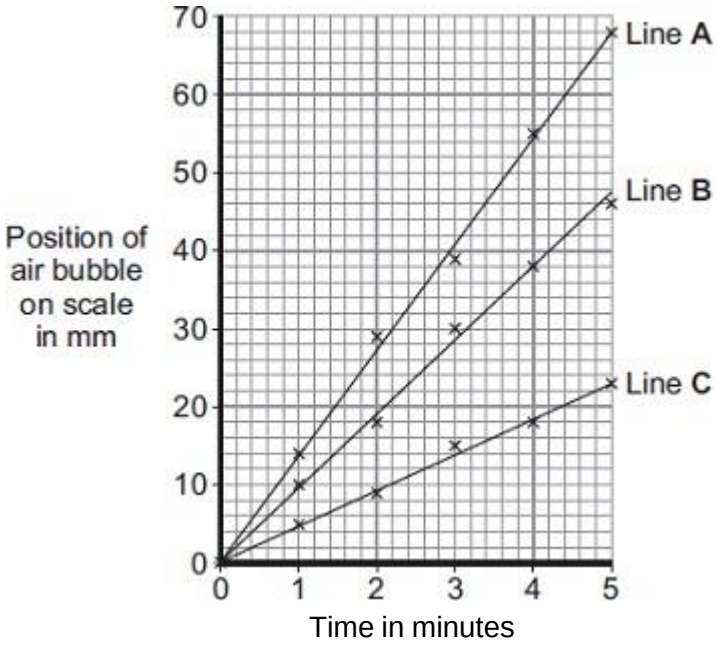
Explain why.

_____

_____

(1)

(b) The graph shows the students' results.



Which line on the graph, **A**, **B** or **C**, shows the results for each of the three different experiments?

Write each of the letters, **A**, **B** and **C**, in the correct boxes in the table.

Conditions	Letter
No wind at 15°C	
No wind at 25°C	
Wind at 25°C	

(2)

(c) Water is lost from the leaves of the plant cutting.

Name this process.

Draw a ring around **one** answer.

distillation **respiration** **transpiration**

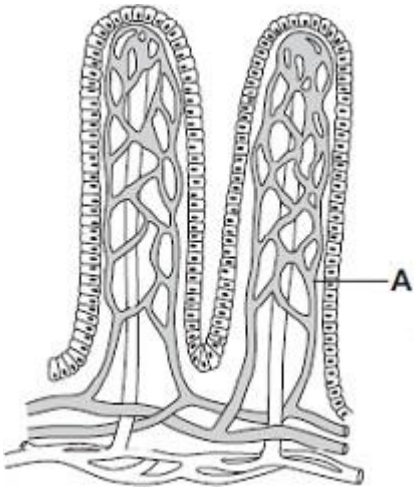
(1)

(Total 6 marks)

5 Villi are found in some parts of the digestive system.

Diagram 1 shows two villi.

Diagram 1



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

(i) Structure **A** is a

muscle.

nerve.

capillary.

(1)

(ii) The villi absorb the products of digestion by

dialysis.

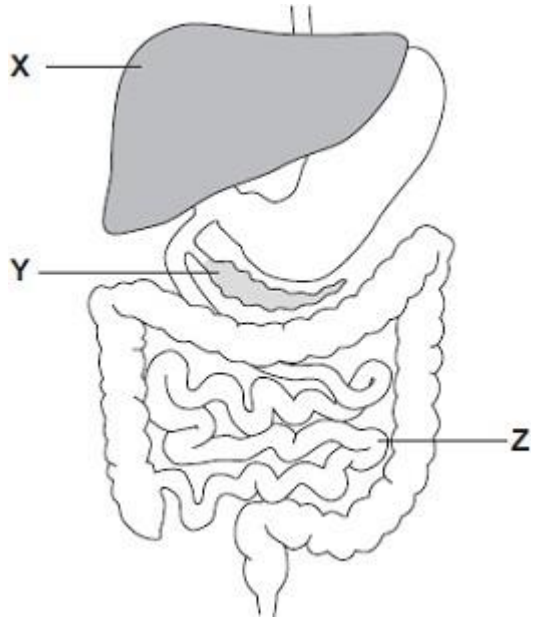
diffusion.

osmosis.

(1)

(b) **Diagram 2** shows the digestive system.

Diagram 2



(i) In which part of the digestive system, **X**, **Y** or **Z**, are most villi found?

(1)

(ii) There are about 2000 villi in each cm^2 of this part of the digestive system.

Why is it helpful to have lots of villi?

_____

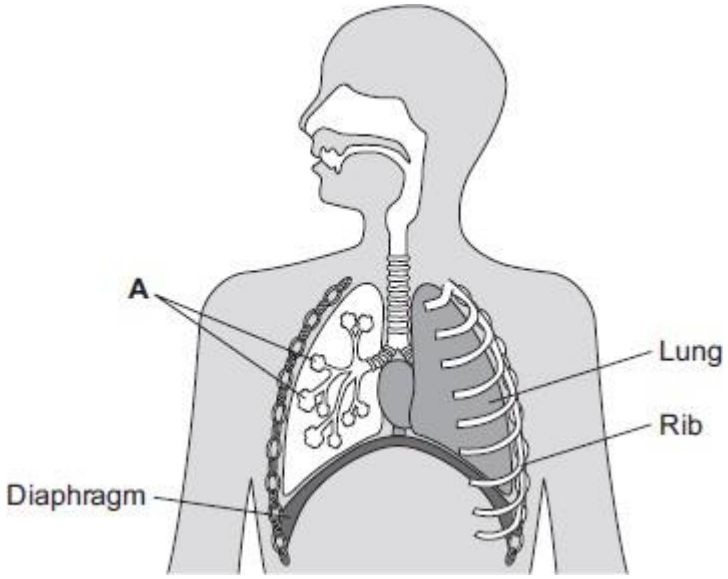
_____

(1)

(Total 4 marks)

6 Our lungs help us to breathe.

The image below shows the human breathing system.



(a) (i) Name part **A**.

_____

(1)

(ii) Give **one** function of the ribs.

_____

(1)

(b) (i) Use the correct answer from the box to complete the sentence.

active transport	**diffusion**	**osmosis**

Oxygen moves from the air inside the lungs into the blood by the process of _____.

(1)

(ii) Use the correct answer from the box to complete the sentence.

arteries	**capillaries**	**veins**

Oxygen moves from the lungs into the blood through the walls of the _____.

(1)

(iii) Inside the lungs, oxygen is absorbed from the air into the blood.

Give **two** adaptations of the lungs that help the rapid absorption of oxygen into the blood.

1. _____

_____

2. _____

_____

(2)

(Total 6 marks)

7 (a) Enzymes are used in body cells.

(i) What is an enzyme?

Draw a ring around the correct answer.

an antibody **a catalyst** **a hormone**

(1)

(ii) All enzymes are made of the same type of substance.

What is this substance?

Draw a ring around the correct answer.

carbohydrate **fat** **protein**

(1)

(iii) Where is the enzyme amylase produced in the human body?

Draw a ring around the correct answer.

liver **salivary glands** **stomach**

(1)

(b) Enzymes are sometimes used in industry.

Draw **one** line from each enzyme to the correct industrial use of that enzyme.

Enzyme	**Industrial use**
Carbohydrase	Changes starch into sugars
Isomerase	Removes grease stains from clothes
Protease	Pre-digests proteins in some baby foods
	Changes glucose syrup into fructose syrup

(3)

(Total 6 marks)

8 (a) (i) Blood is part of the circulatory system.

Draw **one** line from each part of the blood to its correct function.

Part of the blood	Function
 White blood cells	carry glucose around the body
 Red blood cells	carry oxygen around the body
 Platelets	help the blood to clot
	destroy microorganisms

(3)

(ii) Name **one** waste product that is transported by the blood plasma.

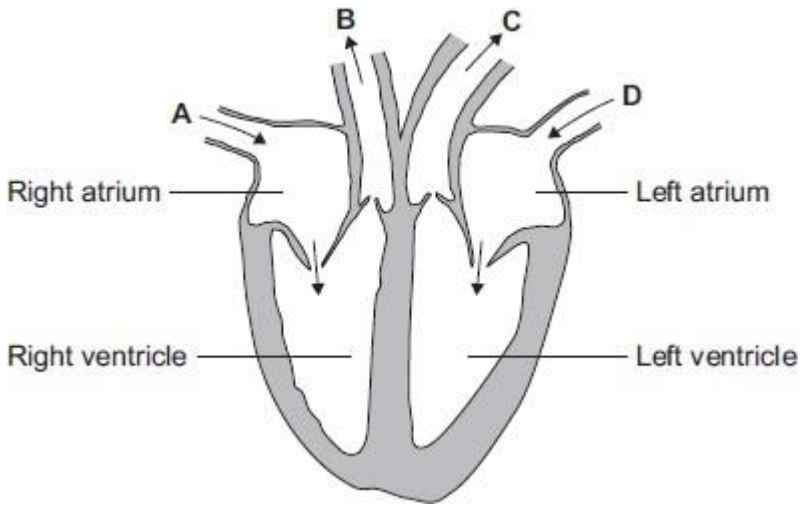
_____

(1)

(b) The heart is also part of the circulatory system.

Figure 1 shows a section through the human heart.

Figure 1



(i) Which arrow, **A**, **B**, **C** or **D**, shows blood leaving the heart in the pulmonary artery to go to the lungs? ☐

(1)

(ii) Which arrow, **A**, **B**, **C** or **D**, shows blood from the lungs entering the heart in the pulmonary vein? ☐

(1)

(iii) Valves in the circulatory system make sure blood only travels in one direction.

Name the type of blood vessel that has valves.

_____

(1)

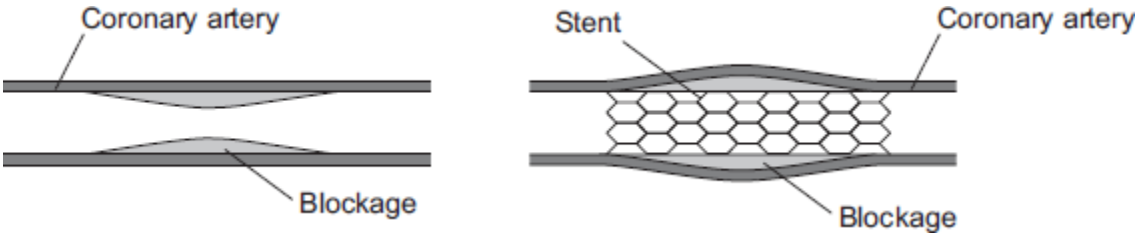
(c) A person's coronary artery has become narrower.

The person has a heart attack.

A doctor puts a stent into the person's coronary artery.

Figure 2 shows a stent inside a coronary artery.

Figure 2



(i) How does the stent help to prevent another heart attack?

Give **one** way.

_____

_____

(1)

(ii) **Figure 3** shows a surgeon putting a stent into a patient.

Figure 3

© Science Photo Library

The surgeon puts the stent into an artery in the leg. He moves the stent through the artery to the coronary artery.

Suggest **two** possible risks of this operation.

1. _____

_____

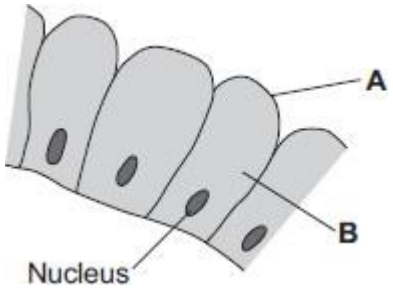
2. _____

_____

(2)

(Total 10 marks)

9 The image below shows some cells in the lining of the stomach.



(a) (i) Use words from the box to name structures **A** and **B**.

cell membrane	**chloroplast**	**cytoplasm**	**vacuole**

A _____

B _____

(2)

(ii) What is the function of the nucleus?

Tick (✓) **one** box.

To control the activities of the cell ☐

To control movement of substances into and out of the cell ☐

To release energy in respiration ☐

(1)

(b) Draw **one** line from each part of the human body to its correct scientific name.

Part of human body	**Scientific name**
Layer of cells lining the stomach	An organ
Stomach	An organism
Mouth, stomach, intestines, liver and pancreas	An organ system
	A tissue

(3)

(Total 6 marks)

Mark schemes

1 (a)

Structure	Organ	Organ system	Tissue
Stomach	✓		
Cells lining the stomach			✓
Mouth, oesophagus, stomach, liver, pancreas, small and large intestine		✓	

all 3 correct = 2 marks
2 correct = 1 mark
1 or 0 correct = 0 marks

2

(b) (i) diffusion

allow phonetic spelling

1

(ii) glucose

1

(iii) mitochondria

1

[5]

2 (a) (i) xylem

1

(ii) phloem

1

(iii) transpiration

1

(iv) stomata

1

(b) (i) any **one** from:

- reduce / prevent evaporation of water from flask
- holds plant shoot in place
- prevent damage to the plant

1

(ii) same surface area **or** number of leaves

*(because if they used larger / smaller size shoots) there would be a larger / smaller surface area **or** a larger/ smaller number of leaves*

allow same number of stomata

1

from which (the same amount of) water evaporates

(and therefore) more / less water would escape

allow from which water escapes

1

(iii) 4.5

look for answer written in table

1

(iv) increasing temperature / heat increases (rate of) water loss / evaporation

1

(v) having moving air / a fan increases (rate of) water loss / evaporation

1

(c) (i) 0.3 g

1

(ii) plastic bag reduces air flow across leaves

or

air is humid around the leaves

allow plastic bag stops water (vapour) leaving

allow air (in plastic bag) becomes saturated (with water)

1

[12]

3 (a) (i) any **two** from:

- fibres not damaged
- machines last longer / machines not damaged by stones

*Only **one** from:*

- short er time or quicker
- low er temperature

uses less energy or cheaper for energy as an alternative to shorter time / lower temperature, if neither of these given

no mark for cheaper unqualified

2

(ii) any **two** from:

- different enzymes (for different dyes)
- enzymes expensive

  no mark for expensive alone
- enzymes have to be removed (from denim material) (after washing / treatment)

2

(b) protease

apply list principle

1

[5]

4 (a) (i) wind

answers in either order

1

temperature

ignore weather

1

(ii) different plants have different sizes

ignore reference to validity

/ different numbers of leaves
/ different sizes of leaves
/ different plants take up different amounts of water
/ different number of stomata
/ different surface area

allow different plants need different amounts of water

1

(b) in table, in sequence:

C
B
A

*all 3 correct = **2** marks*

*2 correct = **1** mark*

*0 or 1 correct = **0** marks*

max 2

(c) transpiration

1

[6]

5 (a) (i) capillary

1

(ii) diffusion

1

(b) (i) Z

ignore any names

1

(ii) large / increased surface / area

allow all food absorbed

or to absorb more food
or improved diffusion

1

[4]

6 (a) (i) alveoli / alveolus

allow air sacs

allow phonetic spelling

1

(ii) any **one** from:
- protection (of lungs / heart)
- help you breathe / inflate lungs.

1

(b) (i) diffusion

1

(ii) capillaries

1

(iii) any **two** from:
- (have many) alveoli

  allow air sacs
- large surface / area
- thin (exchange) surface **or** short diffusion pathway

  accept only one / two cell(s) thick
- good blood supply / many capillaries

  allow (kept) ventilated or maintained concentration gradient.

2

[6]

7 (a) (i) a catalyst

1

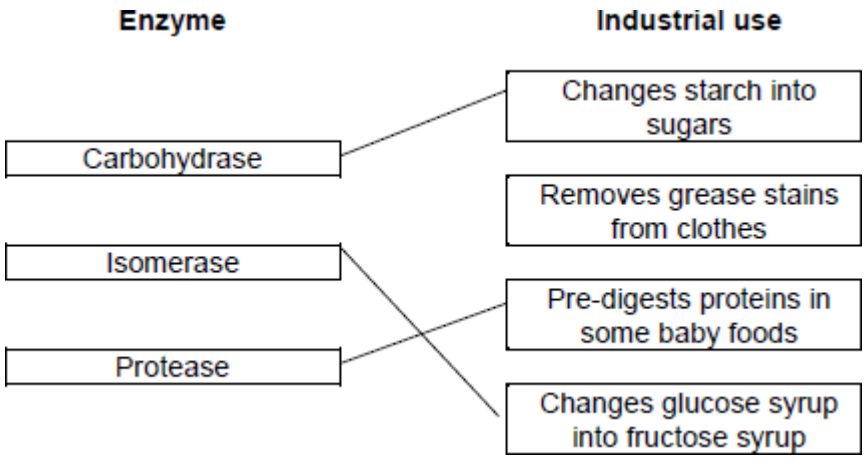
(ii) protein

1

(iii) salivary glands

1

(b)

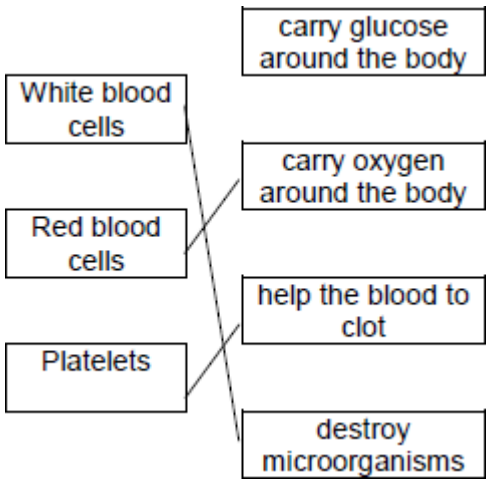


extra lines from any enzyme cancels that mark

3

[6]

8 (a) (i)



one mark for each line

extra line negates a mark

3

(ii) any **one** from:

- carbon dioxide / CO_2
- urea

*do **not** allow urine*

ignore water

ignore ions

1

(b) (i) B

1

(ii) D

1

(iii) vein

accept correct named examples

1

(c) (i) any **one** from:

- keeps artery / blood vessel open **or** widens artery / blood vessel
- allows (more) blood to heart / cardiac muscle
- (allows) blood to flow more easily
- allows (more) oxygen to heart / cardiac muscle

1

(ii) any **two** from:

- bleeding

  allow blood clots
- infection
- damaging blood vessels
- damaging the heart
- risk from anaesthetic

2

[10]

9 (a) (i) A = (cell) membrane

1

B = cytoplasm

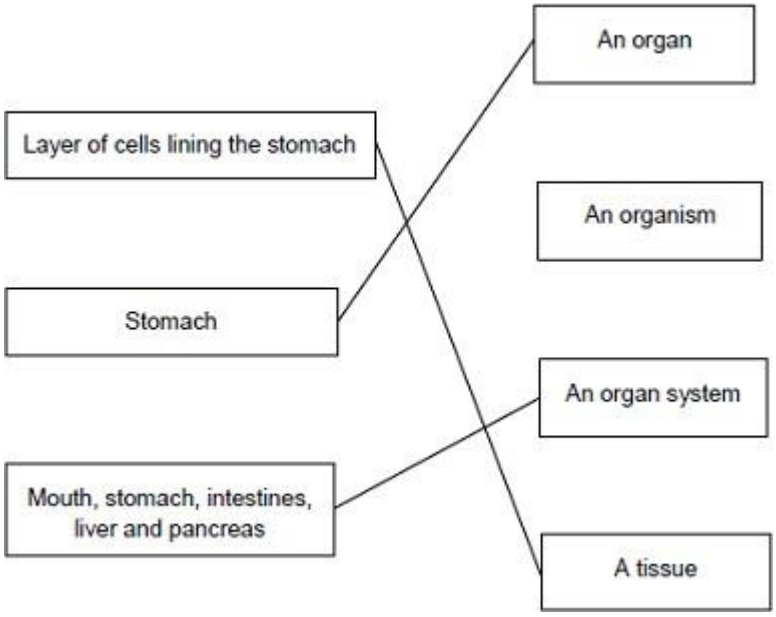
*do **not** accept cytoplast*

1

(ii) To control the activities of the cell

1

(b)



extra lines cancel

3

[6]