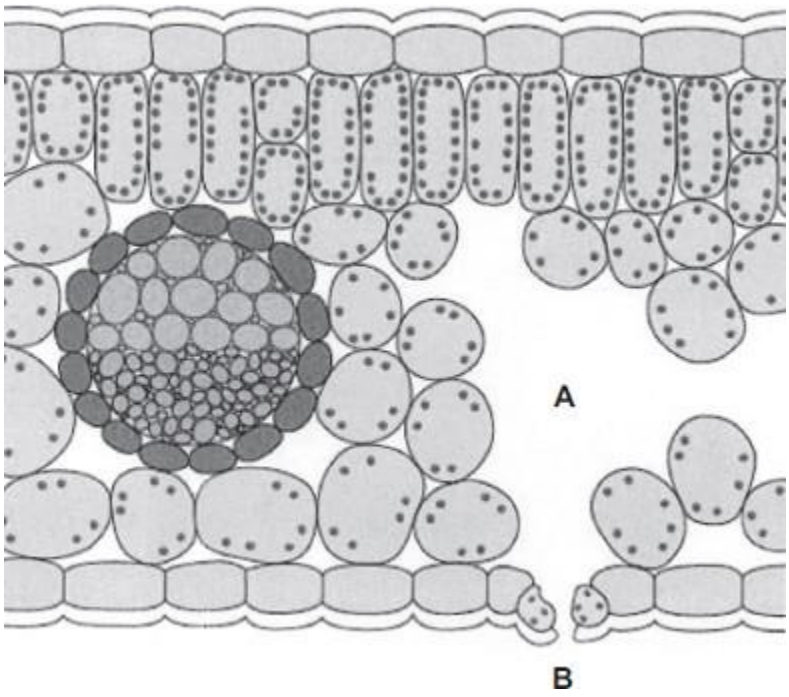
1 The diagram shows a section through a plant leaf.



(a) Use words from the box to name **two** tissues in the leaf that transport substances around the plant.

epidermis	**mesophyll**	**phloem**	**xylem**

_____ and _____

(1)

(b) Gases *diffuse* between the leaf and the surrounding air.

(i) What is *diffusion*?

_____

_____

_____

_____

(2)

(ii) Name **one** gas that will diffuse from point **A** to point **B** on the diagram on a sunny day.

_____

(1)

(Total 4 marks)

2 The table shows the mass of carbon dioxide passed into the atmosphere in one year.

	Mass of carbon dioxide passed into the atmosphere in billions of tonnes per year
Animals	45
Plants	15
Microorganisms	60
Human activity	9

(a) (i) Calculate the total mass of carbon dioxide passed into the atmosphere in one year.

_____

_____

Answer = _____ billion tonnes

(1)

(ii) Plants take 120 billion tonnes of carbon dioxide out of the atmosphere per year.

Use your answer to part (a)(i) to calculate the change in the mass of carbon dioxide in the atmosphere in one year.

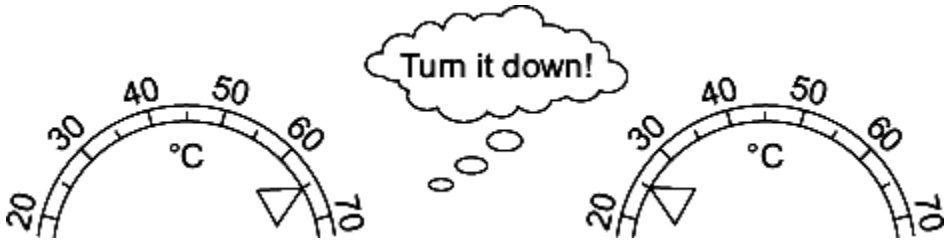
_____

_____

Answer = _____ billion tonnes

(1)

(b) The drawing shows part of a campaign to encourage householders to reduce the temperature of the water used to wash clothes.



Give **two** advantages to the environment of reducing the temperature of the water used to wash clothes.

1. _____

_____

2. _____

_____

(2)

(c) A householder reduces the temperature of the water he uses to wash clothes.
He finds that some stains are not removed at the new temperature.
He decides to use a biological washing powder.
Biological washing powders contain enzymes.

(i) Draw a line from each enzyme in **List 1** to the type of stain the enzyme will remove, in **List 2**.

List 1 **Enzyme**	**List 2** **Type of Stain**
	Starch
Protease	
	Fat
Lipase	
	Protein

(2)

(ii) The biological washing powder would **not** have removed the stains from clothes if the water had been at 65 °C.

Use **one** word from the box to complete the sentence.

killed	denatured	diffused

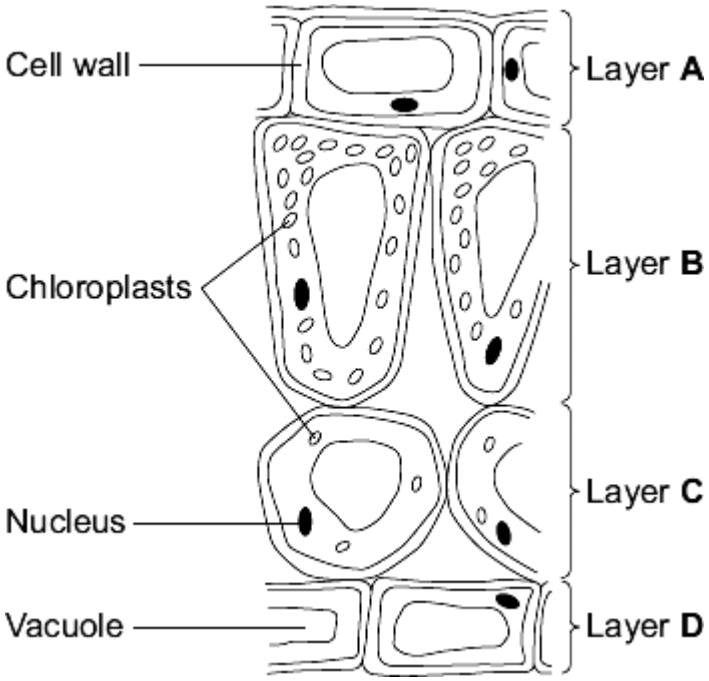
At 65 °C the enzymes would be _____

(1)

(Total 7 marks)

3 Leaves are made from layers of cells.

The diagram shows a section through part of a leaf.



(a) (i) Which word in the table describes layer **A**?

Tick (✓) **one** box.

Layer A	Tick (✓)
Tissue	
Organ	
Cell	

(1)

(ii) Which word describes a whole leaf?

Draw a ring around **one** answer.

organ **tissue** **organism**

(1)

(b) (i) Which **two** layers of cells, **A**, **B**, **C** and **D**, can photosynthesise?

Use information from the diagram to help you.

Tick (✓) **two** boxes.

Layer **A** ☐

Layer **B** ☐

Layer **C** ☐

Layer **D** ☐

(2)

(ii) Give **one** reason for your answer.

_____

_____

(1)

(c) List **X** gives the names of two parts of a cell.
List **Y** gives information about parts of a cell.

Draw **one** line between each part of the cell in list **X** and information about it in list **Y**.

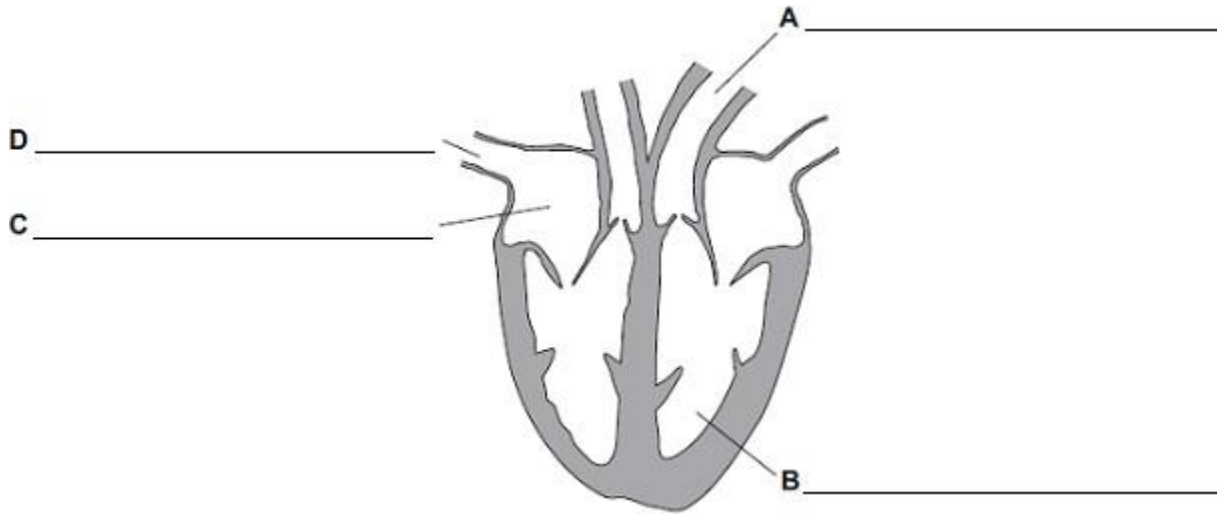
List X **Part of a cell**	**List Y** **Information**
Vacuole	Controls the passage of substances into the cell
Nucleus	Contains the cell sap
	Controls the activities of the whole cell

(2)

(Total 7 marks)

4 **Diagram 1** shows a section through the heart.

Diagram 1



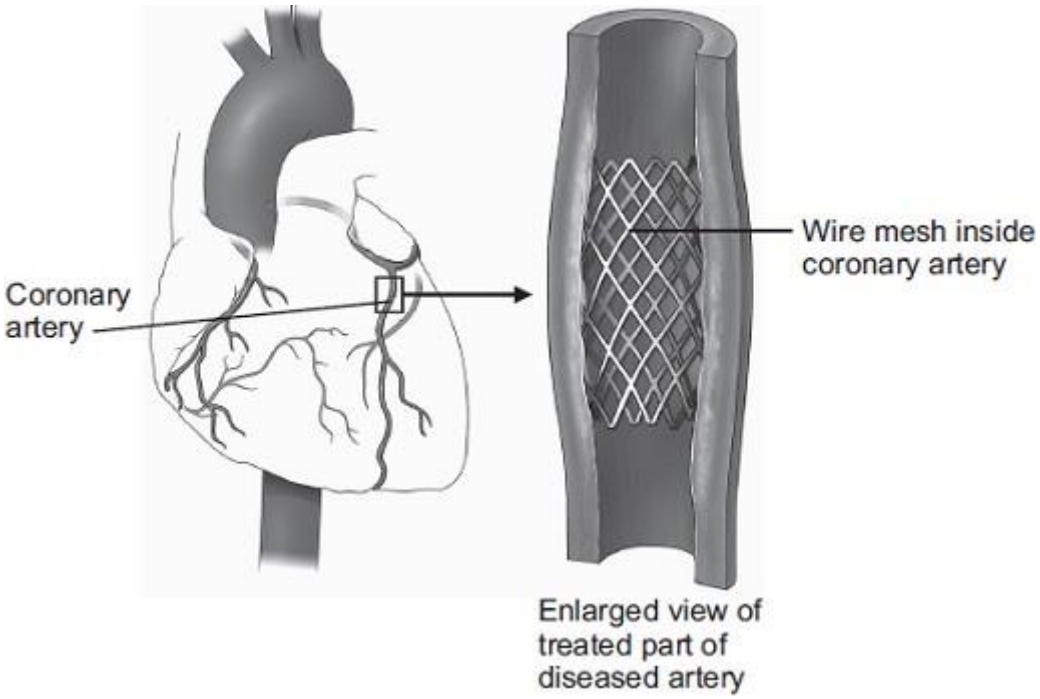
(a) Use words from the box to label parts **A**, **B**, **C** and **D**.

artery	**atrium**	**capillary**	**platelet**	**vein**	**ventricle**

(4)

(b) **Diagram 2** shows one treatment for a diseased coronary artery.

Diagram 2



(i) Name the treatment shown in **Diagram 2**.

_____

(1)

(ii) Explain how the treatment works.

_____

_____

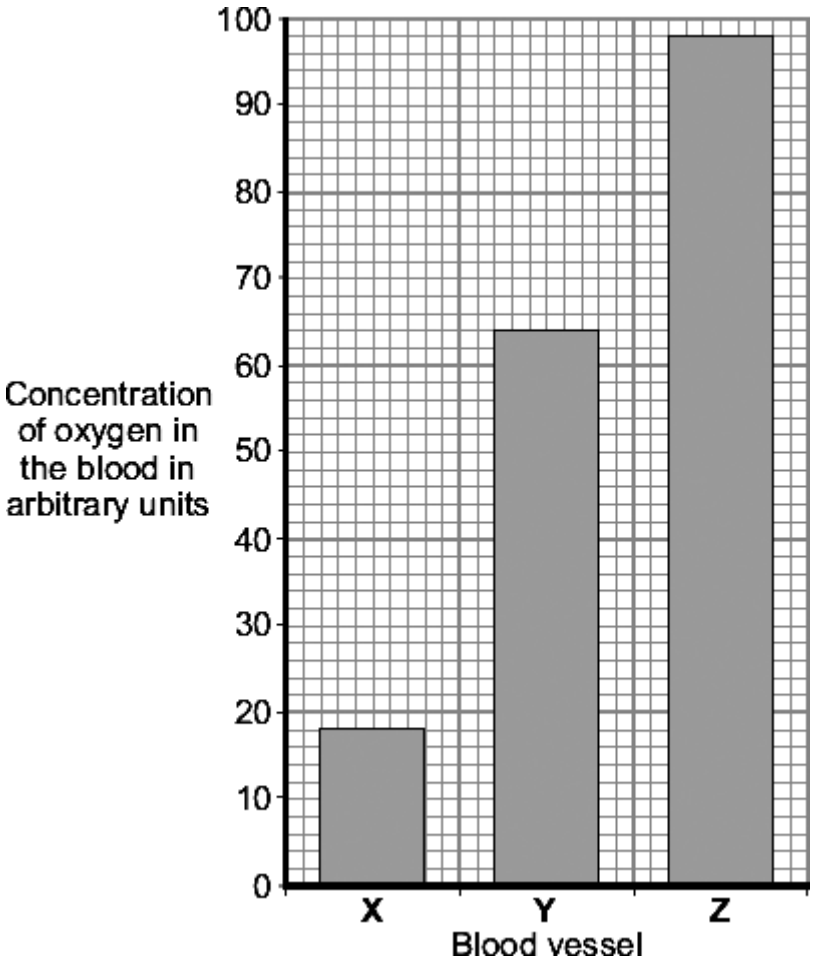
_____

_____

(2)

(Total 7 marks)

5 The bar chart shows the concentration of oxygen in the blood in three different blood vessels, **X**, **Y** and **Z**.



(a) (i) What is the concentration of oxygen in blood vessel **X**?

Answer _____ arbitrary units.

(1)

(ii) Which blood vessel, **X**, **Y** or **Z**, carries blood from the lungs to the heart?

☐

(1)

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

(i) Most of the oxygen in the blood is carried by the

plasma.

red blood cells.

white blood cells.

(1)

(ii) Oxygen combines with a coloured pigment in the blood.

This coloured pigment is called

alveoli.
haemoglobin.
lactic acid.

(1)

(Total 4 marks)

6 (a) **List A** gives four structures in the human body.

List B gives the functions of some structures in the body.

Draw a straight line from each structure in **List A** to the correct function in **List B**.

List A – Structure	**List B – Function**
	Surround and protect the lungs
Alveoli	
	Filter the blood
Veins	
	Carry blood towards the heart
Villi	
	Absorb digested food
Ribs	
	Allow oxygen to enter the blood

(4)

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

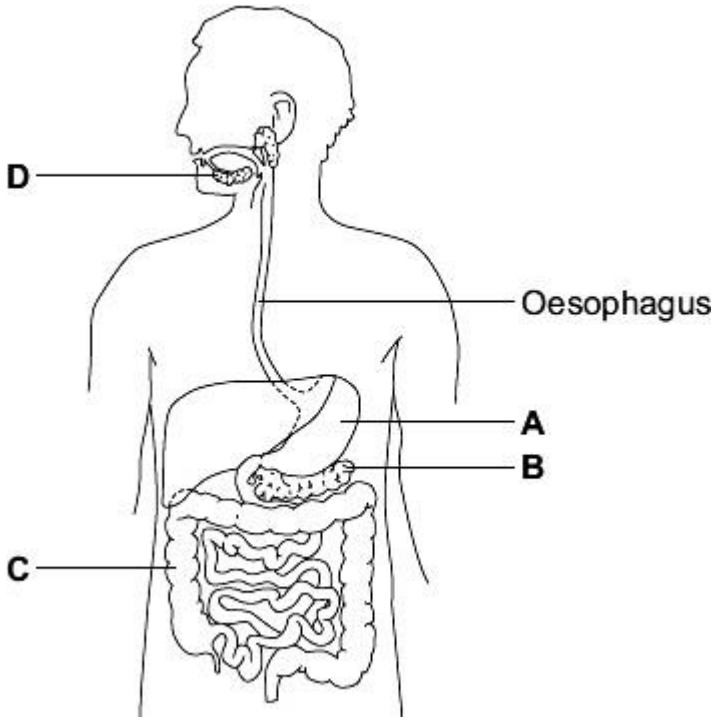
In the lungs, oxygen enters the blood from the air by

diffusion.
filtration.
respiration.

(1)

(Total 5 marks)

7 The diagram shows the human digestive system.



(a) *Heartburn* is a burning feeling caused when acid enters the oesophagus. The acid comes from the stomach.

(i) Which letter on the diagram shows the stomach?

(1)

(ii) Name the acid the stomach produces.

_____

(1)

(iii) Medicines taken to treat *heartburn* contain chemicals that neutralise excess stomach acid.

What type of chemical will neutralise stomach acid?

_____

(1)

(b) Use words from the box and your own knowledge to describe how carbohydrates are digested.

amylase	**starch**	**sugars**

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(5)

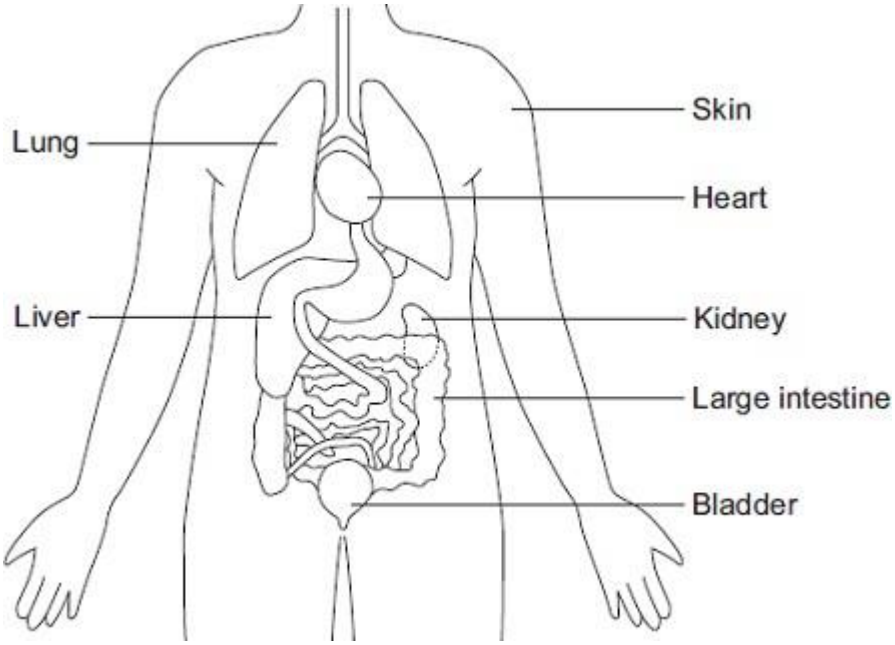
(c) Where in the body are the products of digestion absorbed?

_____

(1)

(Total 9 marks)

8 The diagram shows some of the organs of the human body.



(a) Which organ labelled on the diagram:

(i) produces urine _____

(1)

(ii) stores urine _____

(1)

(iii) produces urea _____

(1)

(iv) gets rid of carbon dioxide _____

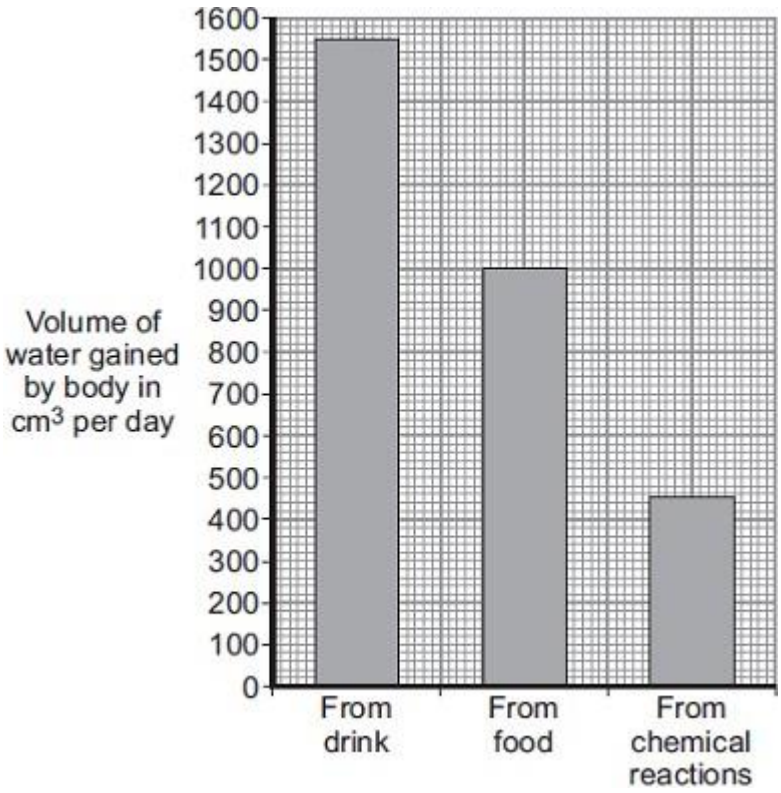
(1)

(v) helps to control body temperature? _____

(1)

(b) **Bar chart 1** shows the volume of water the human body gains each day.

Bar chart 1



Source of water gained by body

(i) Calculate the total volume of water the body gains each day.

_____

_____

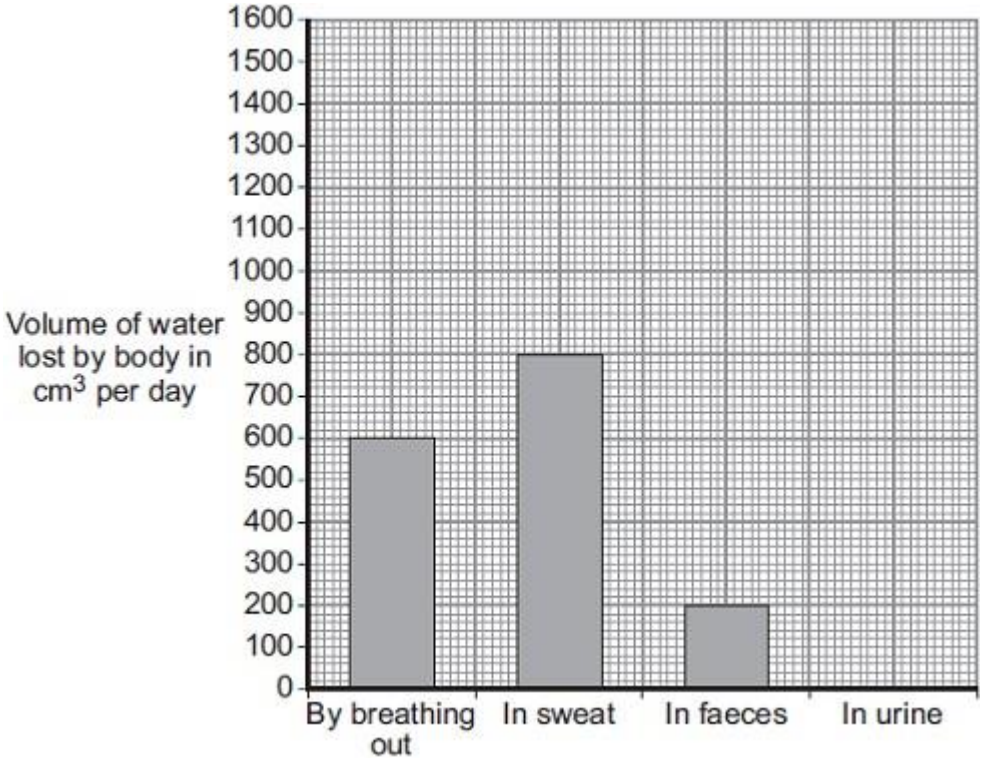
_____

Total volume of water gained = _____ cm^3

(2)

Bar chart 2 shows the volume of water lost each day by breathing out, in sweat and in faeces.

Bar chart 2



Water lost by body

(ii) Calculate the total volume of water lost each day by breathing out, in sweat and in faeces.

Volume = _____ cm^3

(1)

(iii) The volume of water the body loses must balance the volume of water the body gains.

Use your answers to part (b)(i) and part (b)(ii) to calculate the volume of water lost in urine.

Volume of water lost in urine = _____ cm^3

(1)

(iv) Plot your answer to part (b)(iii) on **Bar chart 2**.

(1)

(v) After taking some types of recreational drugs, the kidneys produce very little urine.

What happens to the body cells if the kidneys produce very little urine?

_____

_____

(1)

(Total 11 marks)

9 In a living organism, the cells are organised into organs, systems and tissues.

(a) Use words from the box to complete the list of these structures in order of size.

organs	**systems**	**tissues**

The smallest structure is at the top of the list and the largest is at the bottom.

1 **cells**

(smallest)

2 _____

3 _____

4 _____

(largest)

5 **organism**

(1)

(b) **List A** gives three tissues found in the human body.
List B gives four functions of tissues.

Draw a straight line from each tissue in **List A** to its correct function in **List B**.

List A – Tissue	**List B – Function**
	Covers many parts of the body
Muscular tissue	
	Contracts to cause movement
Glandular tissue	
	Divides by meiosis
Epithelial tissue	
	Releases hormones or enzymes

(3)

(Total 4 marks)

Mark schemes

1 (a) xylem **and** phloem

either order

allow words ringed in box

allow mis-spelling if unambiguous

1

(b) (i) movement / spreading out of particles / molecules / ions / atoms

ignore names of substances / 'gases'

1

from high to low concentration

accept down concentration gradient

ignore 'along' / 'across' gradient

ignore 'with' gradient

1

(ii) oxygen / water (vapour)

allow O_2 / O2

ignore O^2/ O

allow H_2O / H2O

ignore H^2O

1

[4]

2 (a) (i) 129

1

(ii) 9

accept calculated difference between answer to (a)(i) and 120

1

(b) less energy / power used

allow less fuel / named fuel used

ignore cost

1

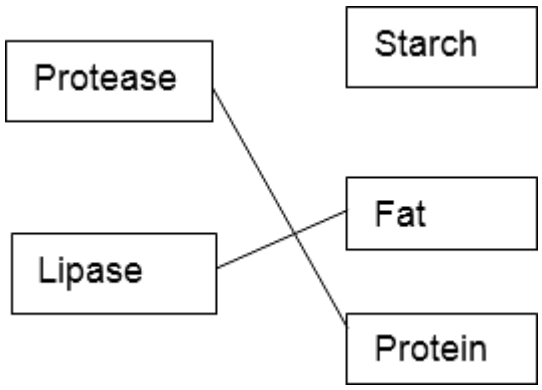
less pollution / carbon dioxide
or less hot water / less heat released

allow less global warming / carbon emissions or reduced carbon footprints

*do **not** accept secondary effects alone, eg less melting of ice caps*

1

(c) (i)



1 *mark for each correct line*

do ***not*** *accept two lines from an enzyme*

2

(ii) denatured

if no answer on the line accept a clear indication of correct answer in the box

1

[7]

3 (a) (i) tissue

extra box ticked cancels the mark

1

(ii) organ

extra ring drawn cancels the mark

1

(b) (i) Layer B

each extra box ticked cancels ***1*** *mark*

1

Layer C

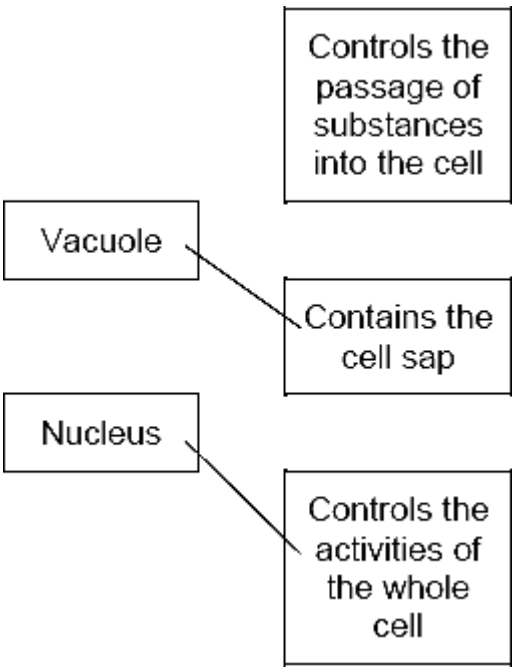
1

(ii) (contain) chloroplasts / chlorophyll

other parts disqualify

1

(c)



*two correct = **2** marks*

*one correct = **1** mark*

extra line from a part of a cell cancels the mark

2

[7]

4 (a) **A** artery

allow aorta

1

B ventricle

ignore references to left and right

1

C atrium

ignore references to left and right

allow atria

1

D vein

allow vena cava

1

(b) (i) stent

1

(ii) keeps (artery) open

1

so (more) blood can flow through

allow blood can flow (more) easily

ignore ref to blood clots

1

[7]

5 (a) (i) 18

1

(ii) Z

1

(b) (i) red blood cells

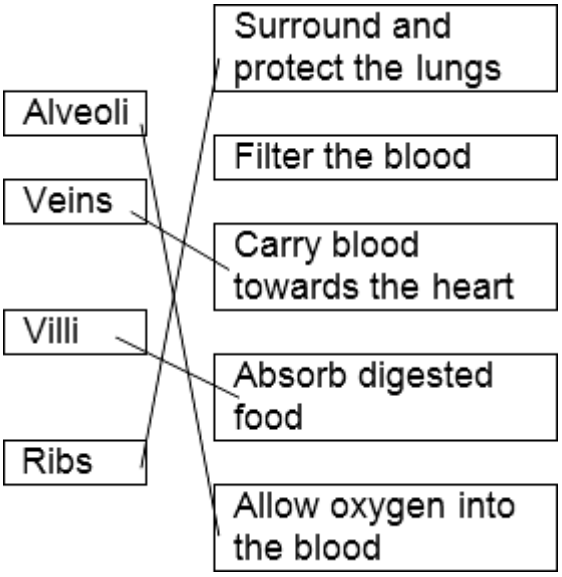
1

(ii) haemoglobin

1

[4]

6 (a)



*4 correct = **4** marks*
*3 correct = **3** marks*
*2 correct = **2** marks*
*1 correct = **1** mark*
extra line from a structure cancels the mark

4

(b) diffusion

1

[5]

7 (a) (i) A

1

(ii) hydrochloric (acid) / HCl

1

(iii) alkali / suitable named example

accept sodium hydrogen carbonate / sodium bicarbonate / milk of magnesia / other brand names
allow bile (salts)
ignore antacid

1

(b) • amylase breaks down starch

1

• (broken down) into sugars / glucose

1

• digestion of starch in the mouth

1

• (also) starch broken down in small intestine

1

• amylase produced in salivary glands / small intestine / pancreas

1

(c) <u>small</u> intestine

allow ileum / duodenum

*do **not** accept large intestine*

1

[9]

8 (a) (i) kidney

1

(ii) bladder

1

(iii) liver

1

(iv) lung(s)

1

(v) skin

1

(b) (i) 3000

allow 2970 to 3030

*correct answer gains **2** marks with or without working*

*if answer incorrect allow **1** mark for evidence of 1550 + 450 + 1000*
(allow tolerance of + or – ½ square on each)

2

(ii) 1600

allow 1570 to 1630

1

(iii) 1400

allow (b)(i) – (b)(ii)

1

(iv) correct plot from (b)(iii)

tolerance ½ square ignore width

1

(v) cells swell / overhydrated / damaged

accept poisoned (by urea)

1

[11]

9 (a) in sequence:

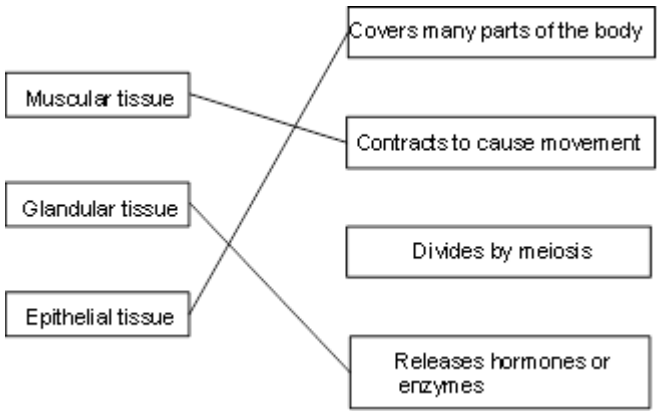
2 = tissue(s)

3 = organ(s)

4 = system(s)

1

(b)



1 *mark for each correct line*

extra line(s) from one tissue cancel

3

[4]