Q1. The following passage is from a newspaper report on a recent conference about global warming.

> If we keep pumping out greenhouse gases, islands in the Pacific will disappear; droughts in Africa will bring famine to 50 million people; floods in low lying places like Bangladesh will make 200 million people homeless; Venice will be submerged:

(a) Name **one** major greenhouse gas.

.....

(1)

(b) Explain how greenhouse gases may cause effects like those described in the passage.

.....

.....

.....

.....

(4)

(Total 5 marks)

Q2. People have burned fossil fuels, eg. coal, in Britain for hundreds of years. Until about two hundred years ago the effects of this could only be seen in large towns where buildings became blackened with soot.

Now we can see other effects. For example animals are being killed in lakes in country areas far from towns and cities. This is because the water there has become much more acidic.
Gases produced by burning fossil fuels are the cause of this.

(a) Name **two** of these gases.

1 .....

2 .....

(2)

(b) These gases are produced in towns. Explain how they can make lakes much more acidic in country areas.

.....

.....

.....

(2)

(c) The effects of burning fossil fuels are much greater now than they were two hundred years ago. Explain why.

.....

.....

.....

(2)

(Total 6 marks)

Q3. The following statement appeared in a popular journal. “Removal of tropical rainforests, more rice fields and greater industrialisation may be causing an increase in the ‘greenhouse effect’.”

Explain this statement as fully as you can.

.....

.....

.....

.....

.....

.....

(Total 5 marks)

Q4. As they go higher up a mountain, mountaineers take less oxygen into their bodies with each breath.

This is shown in the table below.

	MILLIGRAMS OF OXYGEN TAKEN INTO **LUNGS** WITH EACH NORMAL BREATH	MILLIGRAMS OF OXYGEN TAKEN INTO **BLOOD** WITH EACH NORMAL BREATH
At bottom of mountain	300	60
At top of mountain	150	30

(a) At the top of the mountain, they only take half as much oxygen into their lungs with each breath as they did at the bottom.

How does this affect the amount of oxygen that gets into their blood with each breath?

.....

.....

(2)

(b) Why do the cells in the mountaineers' bodies need oxygen?

.....

.....

(1)

(Total 3 marks)

Q5. Sometimes your doctor needs to know how much blood there is in your body. To find this out he first injects a special solution into your blood.

Some time later he takes a sample of your blood.

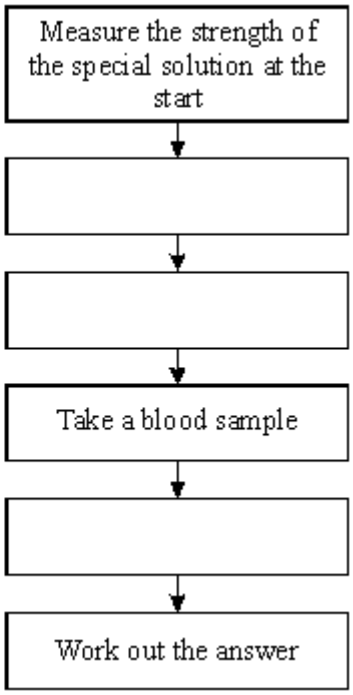
He can then see how much the solution has been watered down.

(a) Put the letters A, B and C on to the diagram to show in order what the doctor does.

A Measure the strength of the special solution in the blood sample

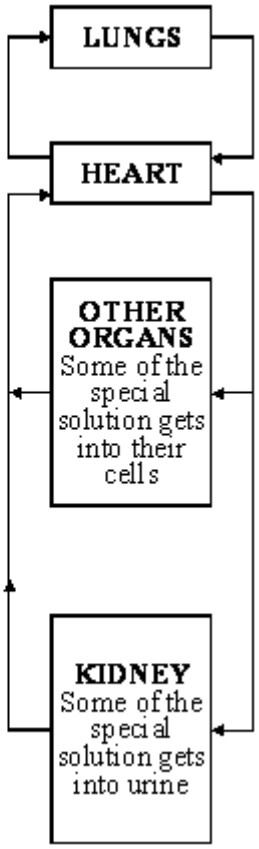
B Inject 10 cm^3 of the solution into the blood

C Wait a while for the solution to mix with the blood



(3)

(b) The diagram shows your body circulation.



Write down **two** reasons why the doctor's way of measuring the amount of blood in your body will **not** give exactly the right answer.

1 .....

.....

2 .....

.....

(2)
(Total 5 marks)

Q6. Some power stations burn coal to make electricity.
Smoke and waste gases go up the chimney.

Suggest **three** ways in which the smoke and waste gases from a power station can damage the environment.

1 .....

.....

2 .....

.....

3 .....

.....

(Total 3 marks)

Q7. Information is passed to target organs in the body by hormones.

(a) (i) How do hormones travel around the body?

.....

(1)

(ii) What name is given to the organs that secrete hormones?

.....

(1)

(b) Explain the cause of diabetes and how it is controlled.

.....

.....

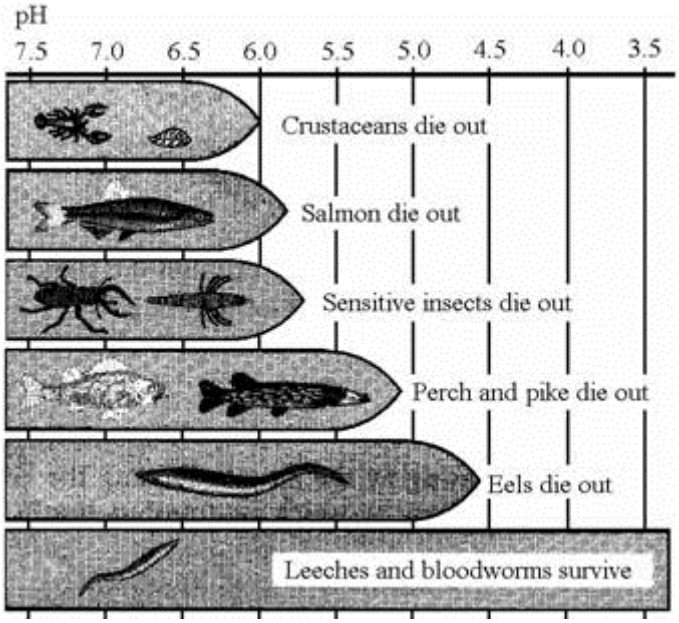
.....

.....

(3)

(Total 5 marks)

Q8. The chart shows how the pH of rivers and lakes affects what can survive in the water.



Adapted from Global Issues of our Time by
John Lidstone with permission of Cambridge University Press

(a) Use the information above to help you complete the following sentence.

The lowest pH condition in which sensitive insects can survive is ..... , but bloodworms can survive in conditions which are very ..... .

(2)

(b) (i) Some acidic gases are atmospheric pollutants.

Give **one** reason why carbon dioxide should **not** normally be considered an atmospheric pollutant.

.....

.....

(1)

(ii) Give the names of **two** acidic gases that are atmospheric pollutants.

..... and .....

(2)

(c) The article gives information about acidified lakes in Scandinavia.

Lapland, in the northern part of Scandinavia, has lakes which are very acidic and also the largest continuous forest damage zones in Europe.

A cause is pollution from two nickel extraction factories, at Nickel and Monchegrorsk in Russia. All trees and plants within 5 kilometres of Nickel and Monchegrorsk are now dead.

Adapted from Global Issues of our Time by John Lidstone with permission of Cambridge University Press

Explain how pollution from the nickel extraction factories, 140 kilometres inside Russia, can damage trees 200 kilometres away in Lapland.

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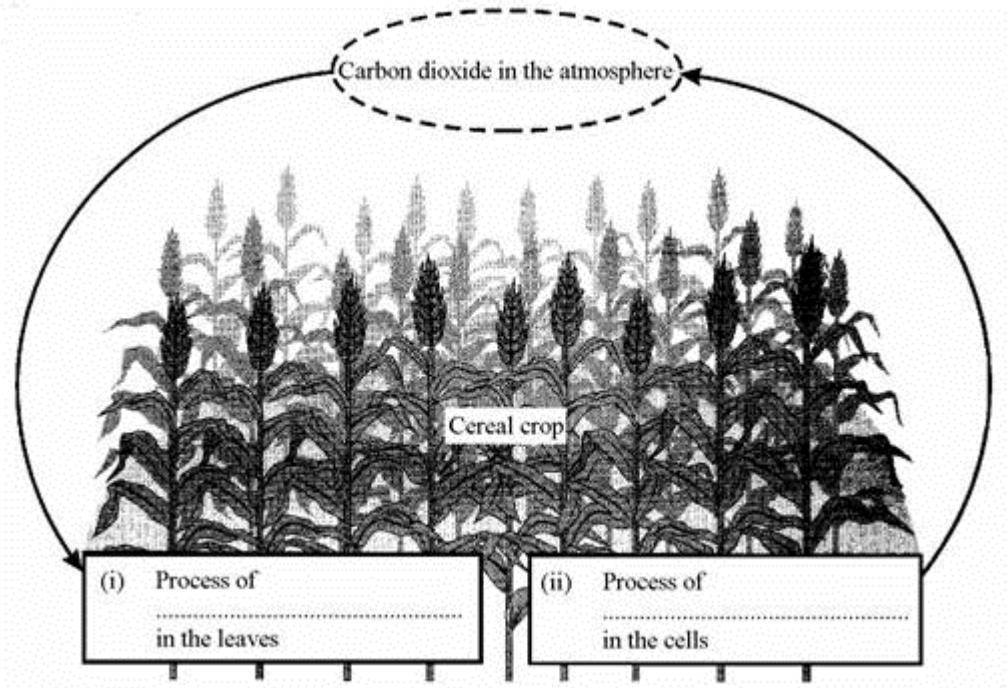
(3)
(Total 8 marks)

Q9. (a) The diagram shows a cereal crop.

Complete spaces (i) and (ii).



(2)

(iii) What sort of weather may cause the cereal crop to wilt?

.....

(1)

(b) Describe the process of transpiration in plants.

.....

.....

.....

.....

.....

.....

(3)

(Total 6 marks)

Q10. Many of the plants that we eat as fruits and vegetables in the UK are imported. The transport used to import foods accounts for about 2.5% of the UK's carbon dioxide emissions. During winter, it is necessary to import foods because most of the UK's fresh vegetables have to be grown in greenhouses. Energy is needed to heat and light these greenhouses.

Give **one** argument for and **one** against growing all of our vegetables in the UK. These arguments should consider the environmental effect of carbon dioxide emissions.

Argument for:

.....

.....

.....

.....

Argument against:

.....

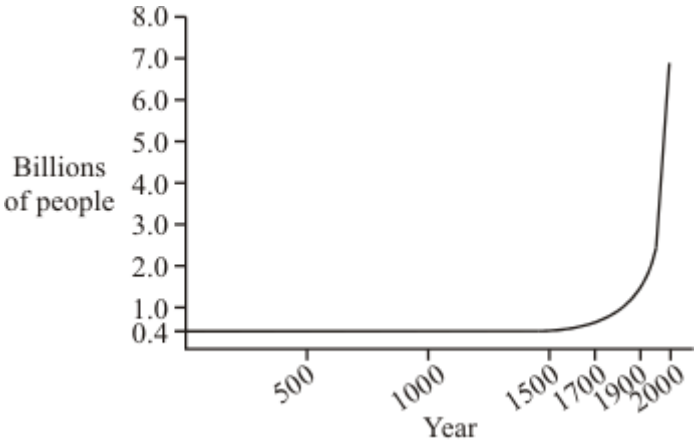
.....

.....

.....

(Total 3 marks)

Q11. Improving the quality of life for everyone without damaging the planet for the future is known as sustainable development.
One problem is the rapid growth in the Earth's population of humans during the last 500 years. This is shown by the graph.



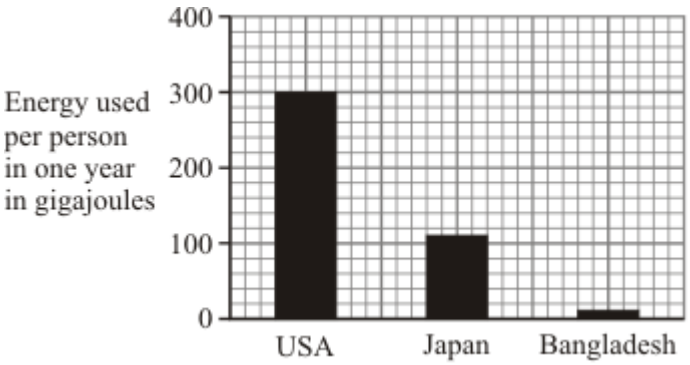
(a) When the Earth's population was much smaller, the effects of human activities on forests were usually small and local.
In the past 500 years there has been large-scale deforestation in some areas. Give **two** reasons for this.

1 .....

2 .....

(2)

(b) Look at the bar chart. It shows the average amount of energy used by each person in one year in the USA, Japan and Bangladesh.



(i) Suggest **one** reason why so much more energy is used per person in the USA than in Bangladesh.

.....

.....

(1)

(ii) Using a lot of resources for energy harms the Earth.
Explain why.

.....

.....

.....

(2)

(c) As we are using more resources, waste management is becoming more important. In the UK much of the solid waste is still being dumped in landfill sites. In 1996, the UK government introduced a landfill tax because landfill sites were being used up. However, the year after the landfill tax was introduced it was estimated that 18 million tonnes of landfill waste was not reported. The government was trying to encourage other forms of waste management, such as:

- reduce waste
- reuse waste
- recycle waste

(i) Explain the main problem caused by the landfill tax.

.....

.....

.....

(2)

(ii) Describe **one** example of how each of the different forms of waste management can be put into practice.

Reduce waste .....

.....

Reuse waste .....

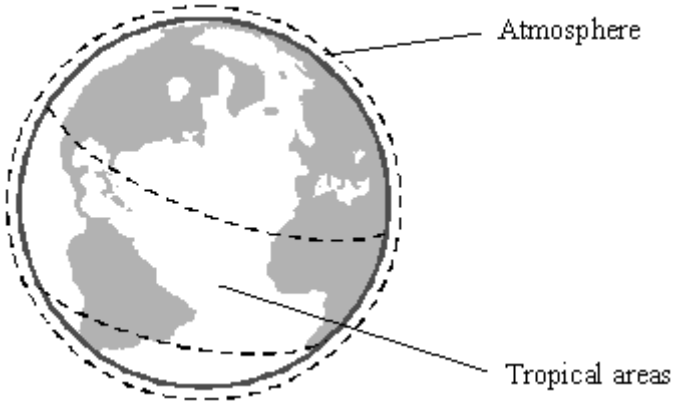
.....

Recycle waste .....

.....

(3)
(Total 10 marks)

Q12. Recently the concentration of carbon dioxide in the Earth's atmosphere has increased slightly. This may be linked to an increase in the 'greenhouse effect'.



(a) The human population has grown rapidly. This has caused an increase in the amount of land used for agriculture, especially in tropical areas.
This has helped to increase the carbon dioxide in the atmosphere.

Give **two** reasons for this.

1 .....

.....

2 .....

.....

(2)

(b) The increased 'greenhouse effect' has caused an increase in the Earth's average temperature.

Give **two** possible environmental effects of this increased average temperature.

1 .....

.....

2 .....

.....

(2)

(c) Name another gas, produced by cattle and rice fields, that also helps cause the 'greenhouse effect'.

.....

(1)
(Total 5 marks)

Q13. The table shows the composition of blood entering and leaving the lungs.

Gas	Concentration in arbitrary units	
	Blood entering lungs	**Blood leaving lungs**
Oxygen	40	100
Carbon dioxide	46	40

(a) Describe, in as much detail as you can, the changes that take place in the composition of blood as it passes through the lungs.

.....

.....

.....

.....

.....

.....

(3)

(b) Which part of the blood:

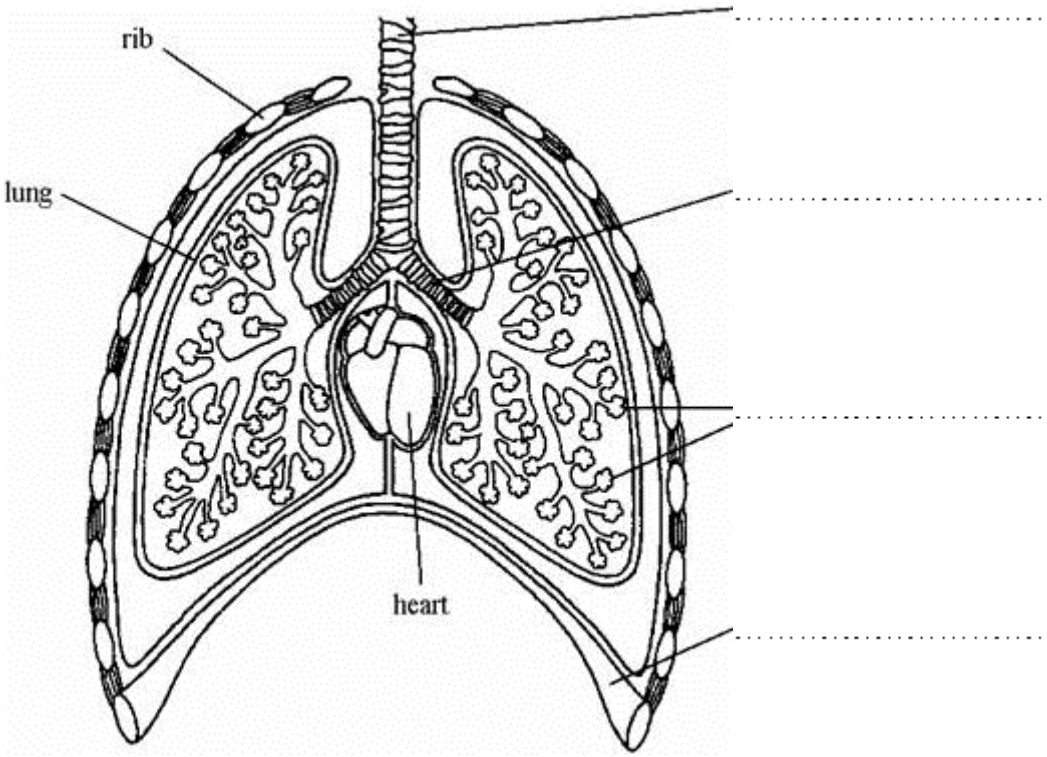
(i) transports most carbon dioxide; .....

(ii) transports most oxygen? .....

(2)

(Total 5 marks)

Q14. The diagram shows part of the breathing system in a human.



(a) Use words from the list to label the parts on the drawing.

alveoli **bronchiole** **bronchus** **diaphragm** **trachea (windpipe)**

(4)

(b) Where in the lungs does oxygen enter the blood?

.....

(1)

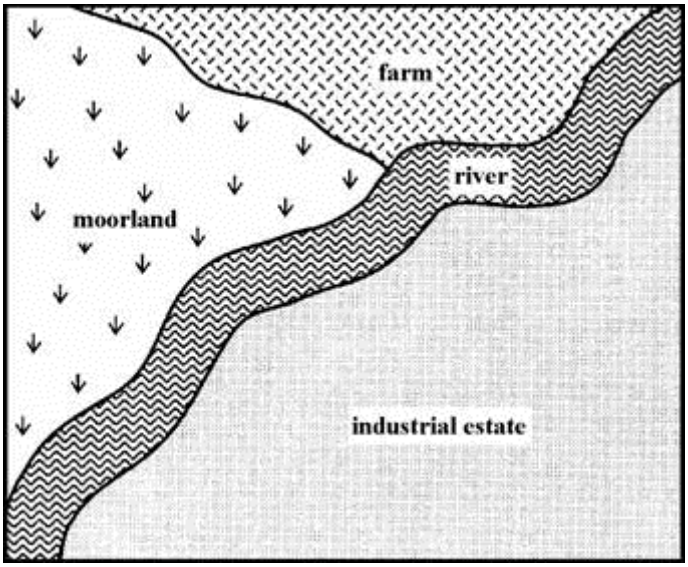
(c) Which process in cells produces carbon dioxide?

.....

(1)

(Total 6 marks)

Q15. The drawing shows an industrial estate and the neighbouring area.



(a) Use words from the list to complete the sentences about effects on the environment.

fertilisers **fuels** **nitrogen** **oxygen**

pesticides **smoke** **sulphur dioxide**

Factories in the industrial estate burn ..... . This pollutes the air with ..... and ..... .

The farm may pollute the river with chemicals such as ..... and ..... .

(5)

(b) Describe how sulphur dioxide may damage the environment.

.....

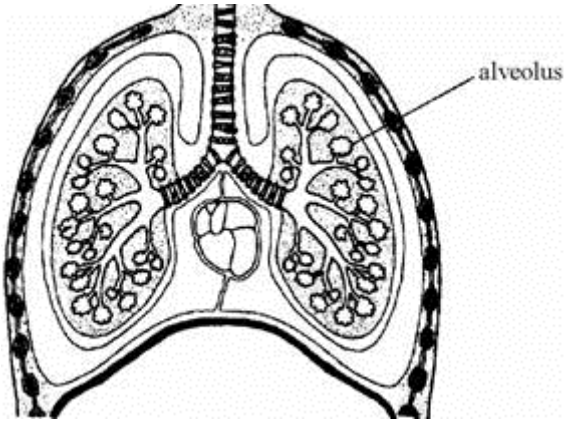
.....

.....

.....

(2)
(Total 7 marks)

Q16. (a) The drawing shows some of the organs in the human thorax.



On the drawing, use guidelines to label:

(i) the heart;

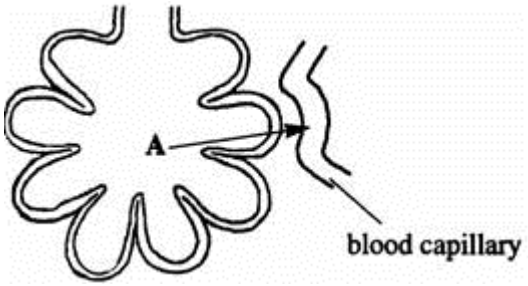
(ii) a rib;

(iii) the diaphragm;

(iv) the trachea.

(4)

(b) The drawing shows a section through an alveolus.



At **A**, oxygen moves from the air in the alveolus into the blood capillary.
Explain, as fully as you can, how oxygen moves into the blood.

.....

.....

.....

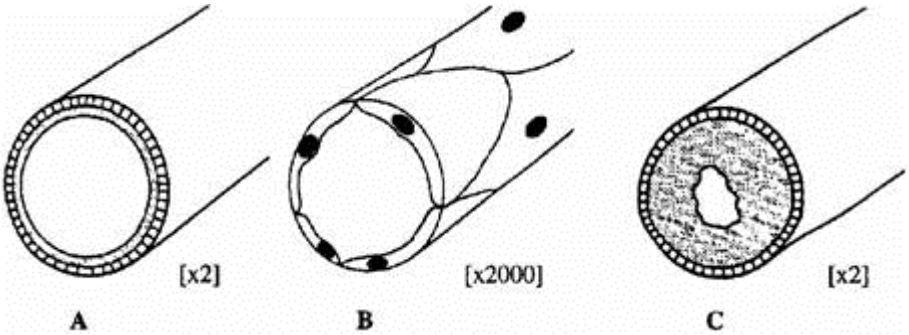
.....

.....

.....

(2)
(Total 6 marks)

Q17. The drawings show the structure of three types of blood vessel, **A**, **B** and **C**. They are drawn to the scales indicated.



(a) Name the **three** types of blood vessel.

A .....

B .....

C .....

(3)

(b) Describe the job of blood vessel **B**.

.....

.....

.....

.....

(2)

(Total 5 marks)

Q18. The kidneys remove waste materials from the liquid part of the blood.

(a) What name is given to the solution of waste stored in the bladder? .....

(1)

(b) The table shows the concentration of certain substances

- in the liquid part of the blood
- in the liquid that has just been filtered from the blood in the kidneys
- in the solution in the bladder.

SUBSTANCE	CONCENTRATION (%)		
	IN LIQUID PART OF BLOOD	IN LIQUID THAT HAS BEEN FILTERED IN THE KIDNEYS	IN LIQUID IN THE BLADDER
Protein	7.0	0	0
Salt	0.35	0.35	0.5
Glucose	0.1	0.1	0
Urea	0.03	0.03	2.0

(i) Which **one** of these substances does **not** pass into the liquid that is filtered in the kidneys?

.....

(1)

(ii) Suggest **one** reason why this substance does **not** pass out of the blood.

.....

(1)

(c) What happens to the glucose in the liquid that is filtered in the kidneys?

.....

(1)

(d) Explain why the concentration of urea in the liquid in the bladder is much greater than the concentration of urea in the liquid that is filtered in the kidneys.

.....

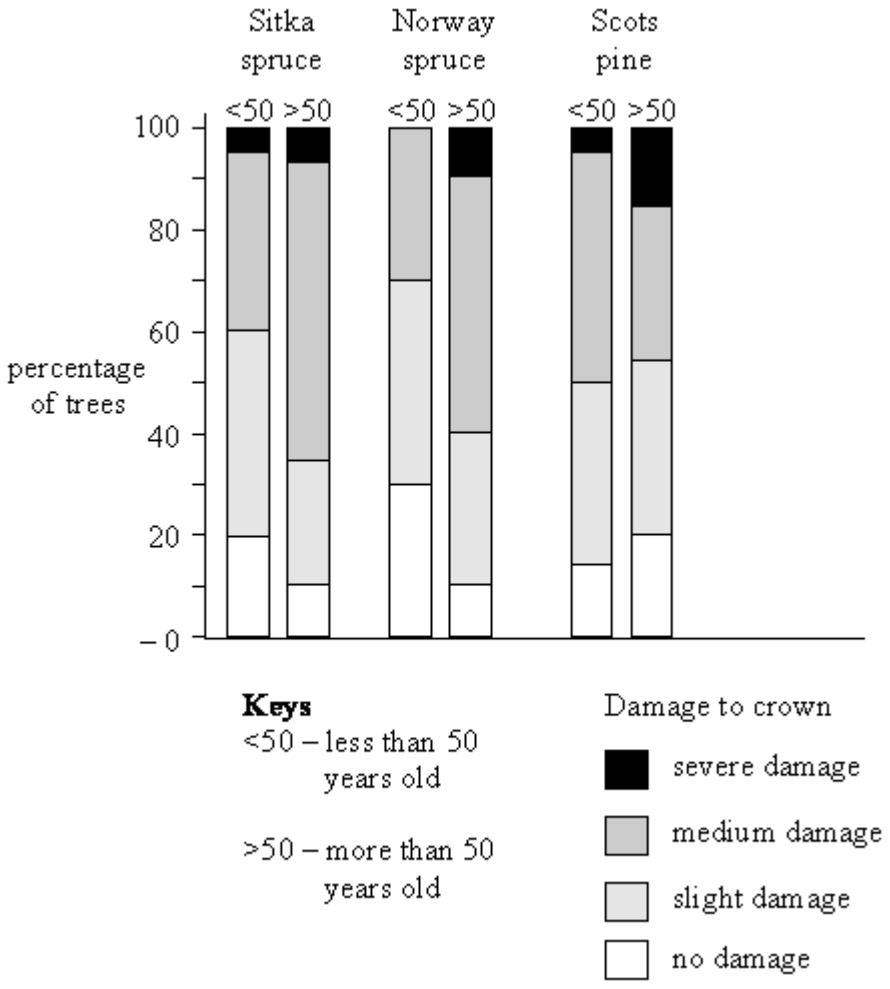
(1)

(Total 5 marks)

Q19. The following are extracts from a Nature Conservancy Council fact sheet.

Trees have been affected by smoke and sulphur dioxide in industrial areas for over 100 years. However, since 1970 people have noticed the rapid increase in a new form of forest damage. The damage involves progressive thinning of the crown of the tree by the loss of leaves, eventually leading to the death of the tree.

Damage to the crowns of three species of tree, Sitka spruce, Norway spruce and Scots pine surveyed in British forests in 1987



(a) Which species and age of trees, had

(i) the highest percentage of trees with no damage to the crown?

.....

(ii) the highest percentage of trees with severe damage to the crown?

.....

(2)

(b) What is the relationship between the age of the trees and damage to the crown?

.....

.....

(1)

(c) The world-wide concentration of sulphur dioxide in the atmosphere has risen considerably over the last hundred years.

(i) Describe, as fully as you can, **one** major source of sulphur dioxide in the atmosphere.

.....

.....

.....

.....

(2)

(ii) Suggest and explain why this large increase in sulphur dioxide concentration has occurred.

.....

.....

.....

.....

(2)

(iii) Describe, as fully as you can, how the sulphur dioxide in the atmosphere reaches trees in forests.

.....

.....

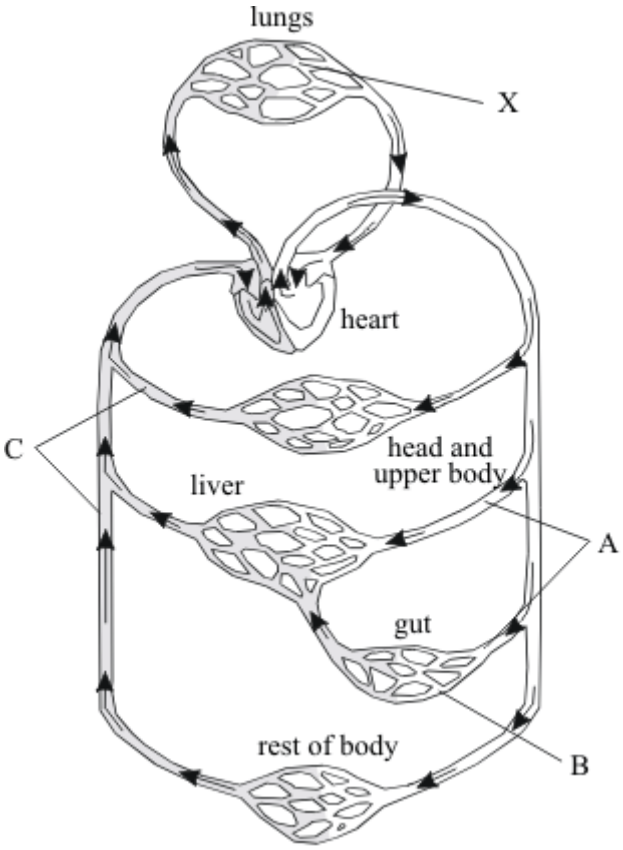
.....

.....

(2)

(Total 9 marks)

Q20. The diagram shows part of the circulatory system.



(a) Name the types of blood vessel labelled A, B and C on the diagram.

A .....

B .....

C .....

(3)

(b) What is the job of the circulatory system?

.....

.....

(1)

(c) Give **two** ways in which the composition of blood changes as it flows through the vessels labelled X on the diagram.

1 .....

.....

2 .....

.....

(2)
(Total 6 marks)

Q21. Coastal grazing marshes provide grazing for cattle and sheep. They also support huge numbers of birds and a wide range of water plant and animal communities. Some of these communities include nationally rare species.

There has been a dramatic reduction in the extent of the grazing marshes in the estuary of the river Thames in recent years. These grazing marshes are downstream from the capital city, London.

The table below shows what some of the grazing marshes have been converted into.

CONVERTED TO	MEAN ANNUAL RATE OF CONVERTION TO OTHER LAND-USED (Hectares/Year)			
	1935-68	1968-72	1972-81	1981-89
Roads and buildings	83	186	142	45
Formal open spaces (parks)	11	30	12	27
Arable (crop-growing)	49	188	90	102
Open water	9	9	7	4
Woodland	3	1	3	2

(a) Explain, as fully as you can, why you think it has been necessary to convert these marshes to other uses.

.....

.....

.....

.....

.....

(3)

(b) Explain, as fully as you can, the possible further effects that these changes in land-use might have on the environment and on the organisms which live in the environment.

.....

.....

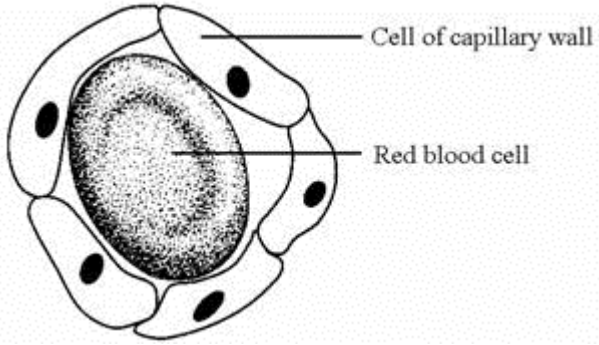
.....

.....

.....

(4)
(Total 7 marks)

Q22. 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.

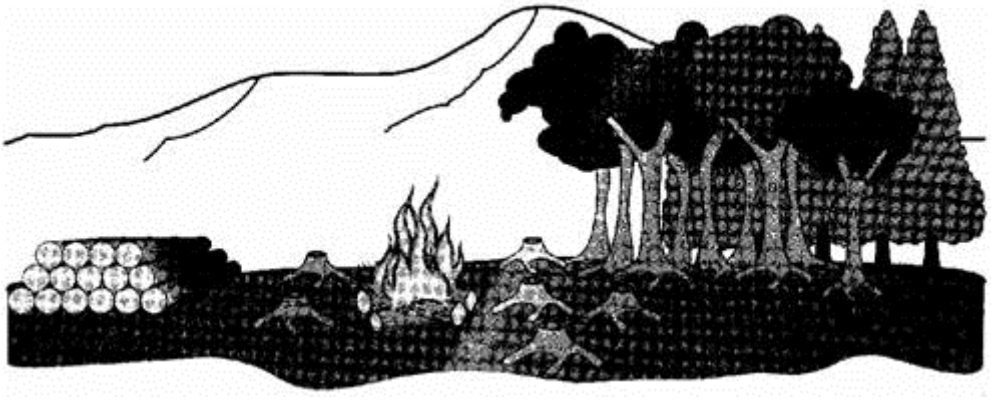
.....

.....

.....

(2)
(Total 4 marks)

Q23. Tropical rainforests are being cut down to provide hardwood for furniture and to make way for roads and for agriculture. In the 1990s they were being destroyed at a rate of 15 hectares per minute.



(a) Calculate the number of hectares destroyed in **one** day.

..... hectares

(1)

(b) Soil erosion can be increased by deforestation. Explain how.

.....

.....

.....

(2)

(c) (i) The gas carbon dioxide can contribute to the greenhouse effect. Explain how deforestation over a wide area can contribute to the greenhouse effect.

.....

.....

.....

.....

(3)

(ii) One result of the increased greenhouse effect is global warming. Describe **two** possible effects of global warming on the world.

.....

.....

.....

(2)

(iii) It is possible that planting new forests could stop global warming. Explain why this could happen.

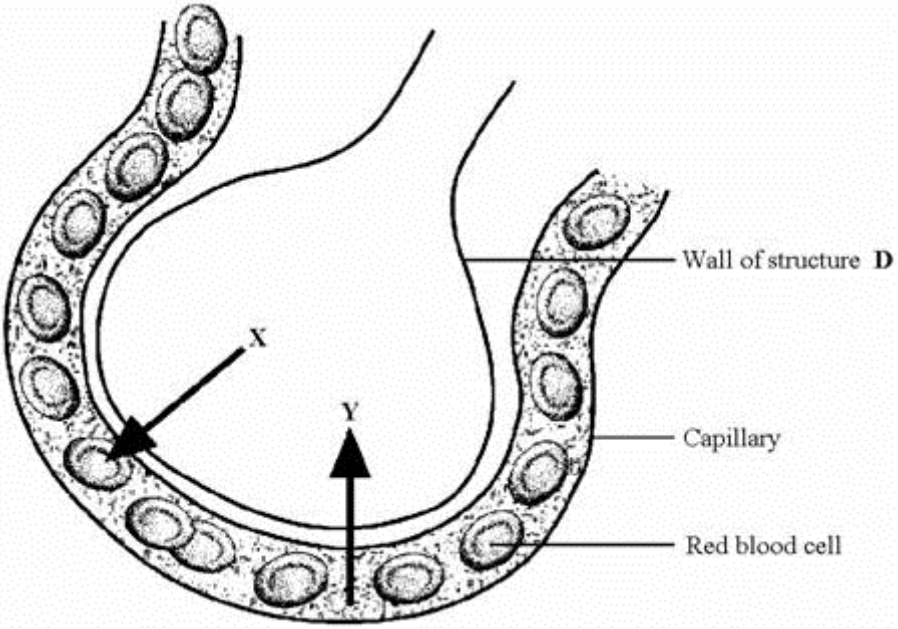
.....

.....

.....

(2)
(Total 10 marks)

Q24. The diagram shows an enlargement of structure **D**.



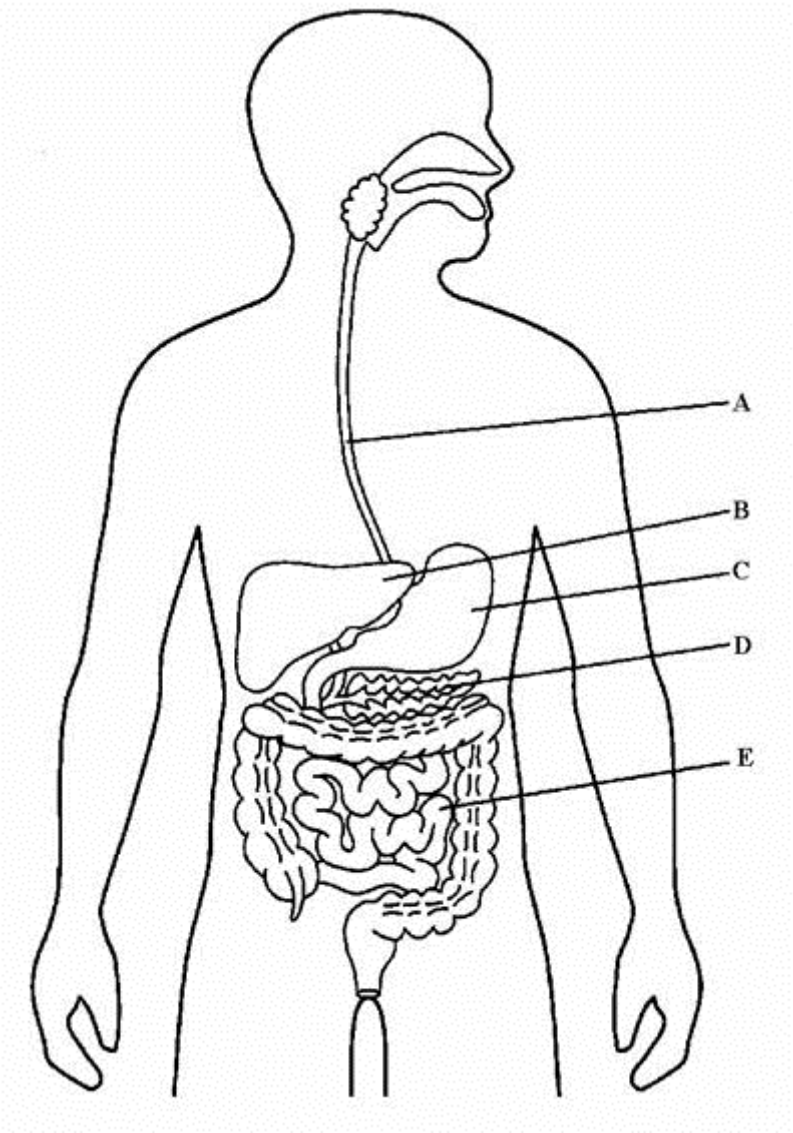
The arrows show the direction of the gases exchanged in this structure. Name gas **X** and gas **Y**.

X .....

Y .....

(Total 2 marks)

Q25. The diagram shows part of the human digestive system.



(i) Name part **B**.

.....

(1)

(ii) Describe the role of **B** and **D** in reducing blood sugar levels.

.....

.....

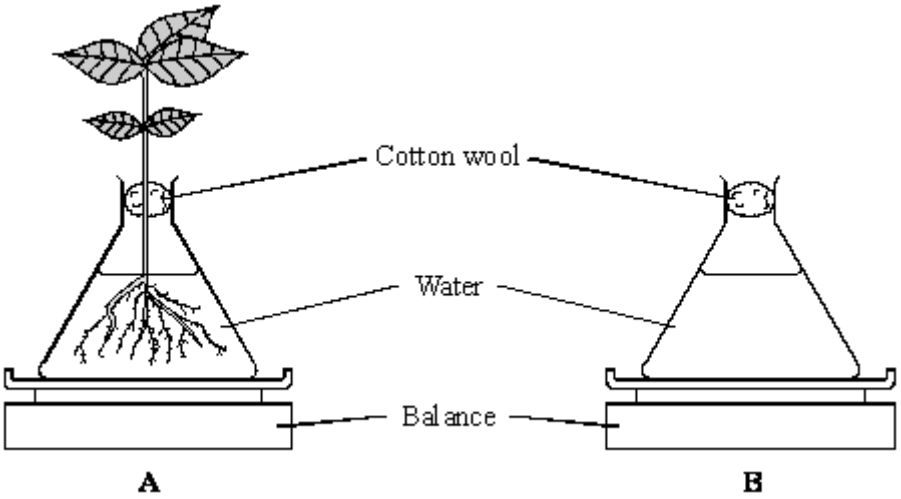
.....

.....

.....

(2)
(Total 3 marks)

Q26. Some students set up the following apparatus.



The balances show the same mass at the start of the investigation.

After 24 hours the mass of flask **B** was the same but the mass of flask **A** had changed.

(i) Describe and explain the change to the mass of flask **A**.

.....

.....

.....

.....

.....

(3)

(ii) Why did the students need to set up flask **B**?

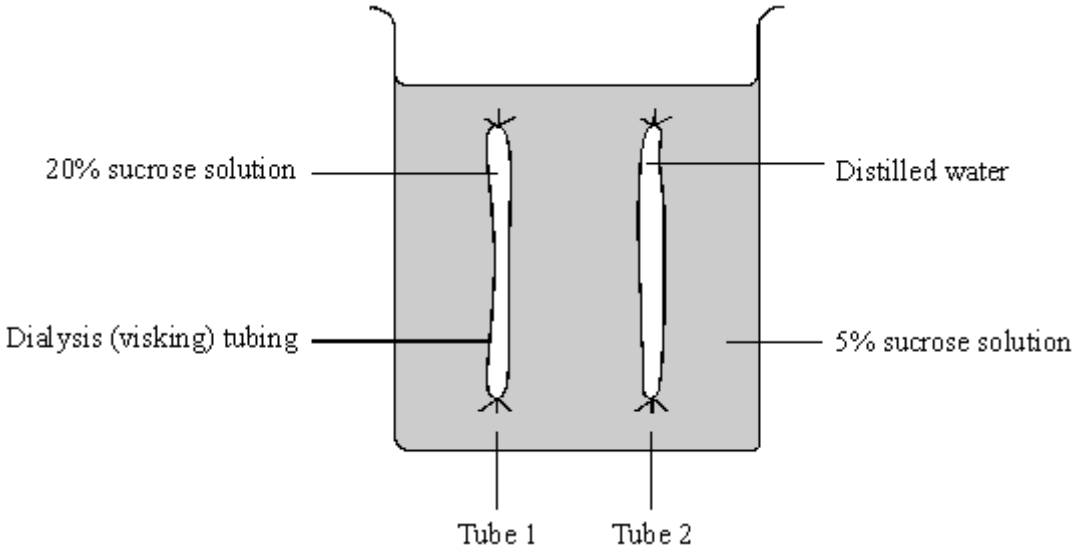
.....

.....

(1)

(Total 4 marks)

Q27. 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.

.....

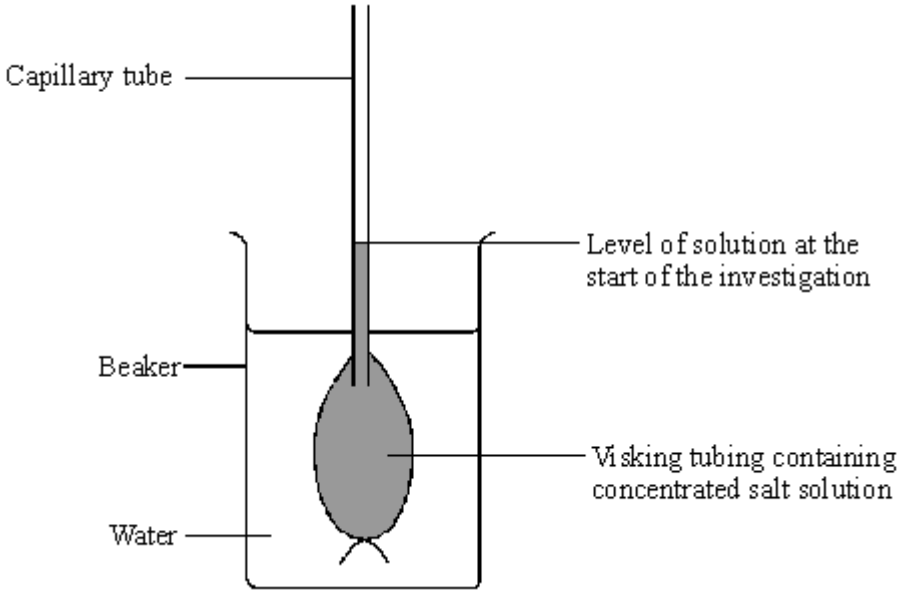
.....

.....

.....

(2)
(Total 8 marks)

Q28. Some students set up the equipment below to investigate osmosis.



(a) What is osmosis?

.....

.....

.....

(3)

(b) (i) What will happen to the water level in the capillary tube during the investigation because of osmosis?

.....

(1)

(ii) Use your knowledge of osmosis to explain why this happens.

.....

(2)

(Total 6 marks)

Q29. Explain how cars and factories can cause acid rain.

.....

.....

.....

.....

.....

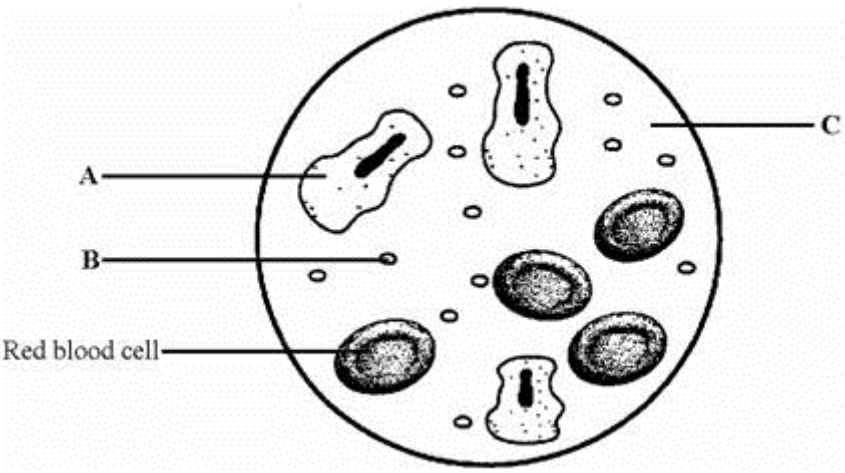
.....

.....

.....

(Total 4 marks)

Q30. The diagram shows four parts of blood.



(a) Complete the table to give the name and function of the parts labelled **A**, **B** and **C**.

Letter	Name	Function
A	.....	....
B	.....	....
C	.....	....

(6)

(b) Red blood cells contain haemoglobin. Explain how this enables red blood cells to pick up oxygen from the alveoli and release it to cells in other parts of the body.

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(4)
(Total 10 marks)

Q31. (a) Why is the removal of water from the body an example of homeostasis?

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(1)

(b) Why is homeostasis important in the body?

.....

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(1)

(c) This system also excretes a substance called urea.

What is excretion, and why is it necessary in the body?

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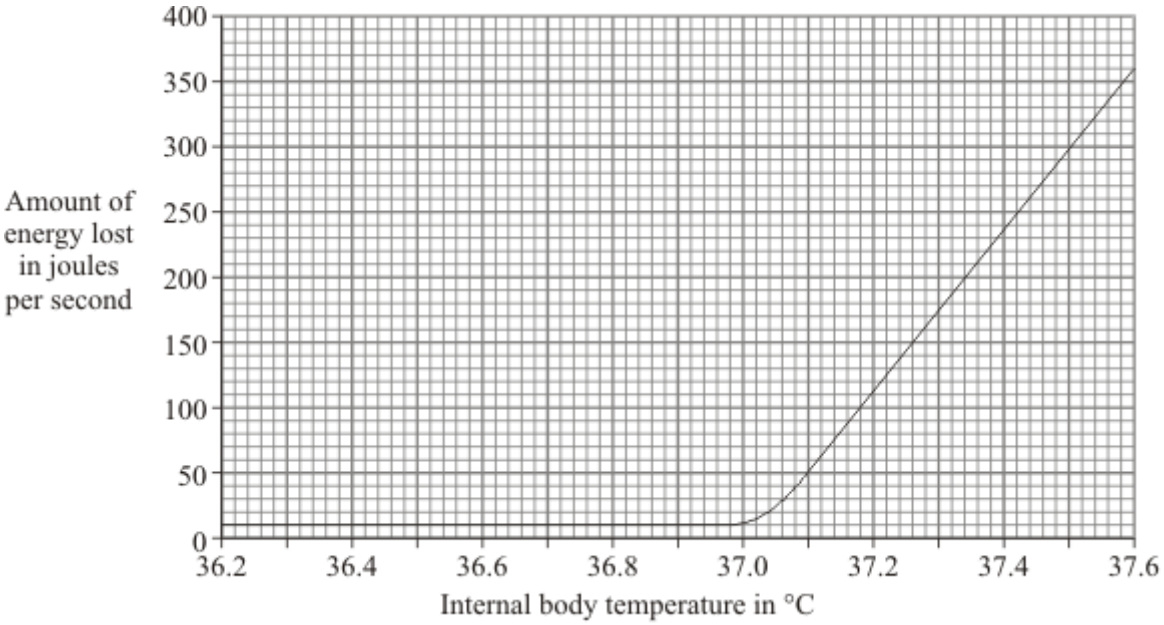
(2)
(Total 4 marks)

Q32. The internal body temperature determines how much a person sweats. The graph shows the effect of different internal body temperatures on a person's rate of energy loss by sweating.



(a) How much more energy was lost from the body each second by sweating when the body temperature was 37.6 °C than when it was 36.6 °C? Show clearly how you work out your final answer.

.....

.....

Amount of energy = ... joules per second

(2)

(b) Explain why a person would feel more thirsty when the body temperature was 37.6 °C than when it was 36.6 °C.

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(2)

(c) Explain how sweating helps to control body temperature.

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(3)
(Total 7 marks)

Q33. The table shows the effects that two different concentrations of sulphur dioxide in the air had on the growth of rye grass plants.

Sulphur dioxide concentration in the air in micrograms per m^3	**9.0**	**191.0**
Number of leaves per plant	85.6	47.3
Total leaf area in cm^2	417.2	203.6
Dry mass of stubble in grams	0.48	0.22

(a) What human activity releases sulphur dioxide into the air?

.....

(1)

(b) (i) What effect does sulphur dioxide have on rainwater?

.....

.....

(1)

(ii) Use information from the table to describe **one** effect of sulphur dioxide on the leaves of the grass plants.

.....

.....

(1)

(c) The stubble consists of the bases of the stems of the plants and the roots left in the soil after harvesting.

Use your answer to part (b) to explain why the dry mass of the stubble was less at the higher concentration of sulphur dioxide.

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.....

(2)
(Total 5 marks)

Q34. Four leaves were removed from the same plant. Petroleum jelly (a waterproofing agent) was spread onto some of the leaves, as follows:

Leaf **A**: on both surfaces
Leaf **B**: on the lower surface only
Leaf **C**: on the upper surface only
Leaf **D**: none applied

Each leaf was then placed in a separate beaker, as shown in diagram **1**.

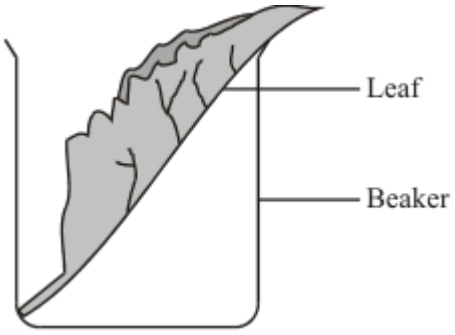
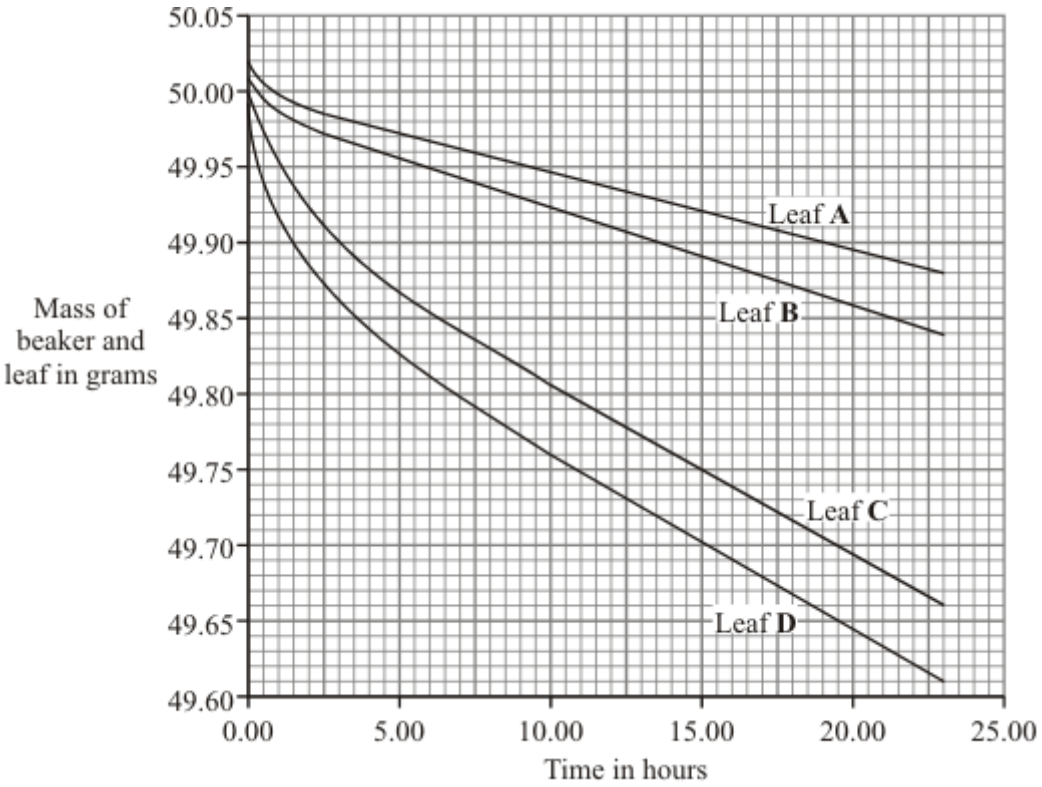


Diagram 1

Each beaker was weighed at intervals. The results are shown in the graph.



(a) Give evidence from the graph in answering the following questions.

(i) Which surface (upper or lower) loses water most rapidly? .....

Evidence .....

.....

(1)

(ii) Is water lost from both surfaces of the leaf? .....

Evidence .....

.....

(1)

(b) Diagram **2** shows the appearance of each surface of the leaf as seen through a microscope.

Upper Surface of Leaf **Lower Surface of Leaf**

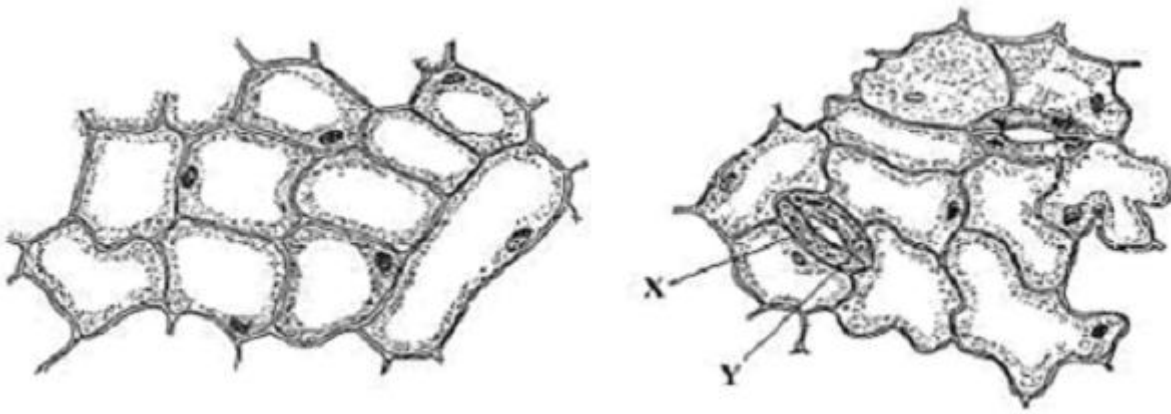


Diagram 2

(i) Name space **X** and cell **Y**.

X .....

Y .....

(2)

(ii) Use information in diagram **2** to explain why the results are different for leaves **B** and **C**.

.....

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.....

.....

(2)
(Total 6 marks)

Q35. Four leaves were removed from the same plant. Petroleum jelly (a waterproofing agent) was spread onto some of the leaves, as follows:

Leaf **A**: on both surfaces
Leaf **B**: on the lower surface only
Leaf **C**: on the upper surface only
Leaf **D**: none applied

Each leaf was then placed in a separate beaker, as shown in diagram **1**.

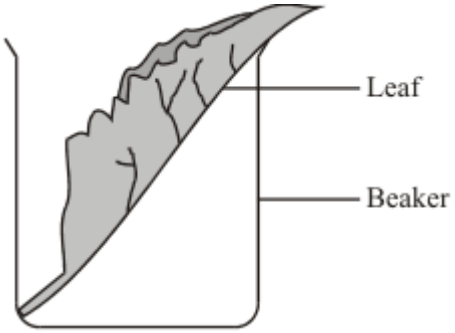
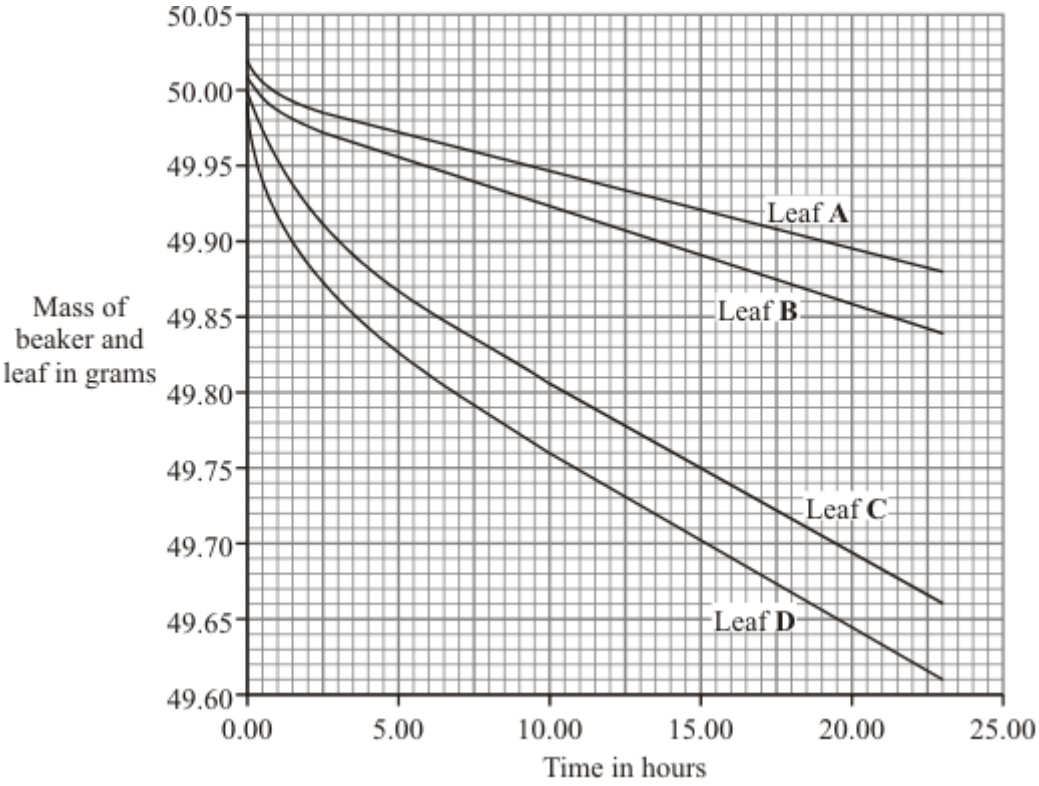


Diagram 1

Each beaker was weighed at intervals. The results are shown in the graph.



(a) Give evidence from the graph in answering the following questions.

(i) Which surface (upper or lower) loses water most rapidly? .....

Evidence .....

.....

(1)

(ii) Is water lost from both surfaces of the leaf? .....

Evidence .....

.....

(1)

(b) Diagram **2** shows the appearance of each surface of the leaf as seen through a microscope.

Upper Surface of Leaf **Lower Surface of Leaf**

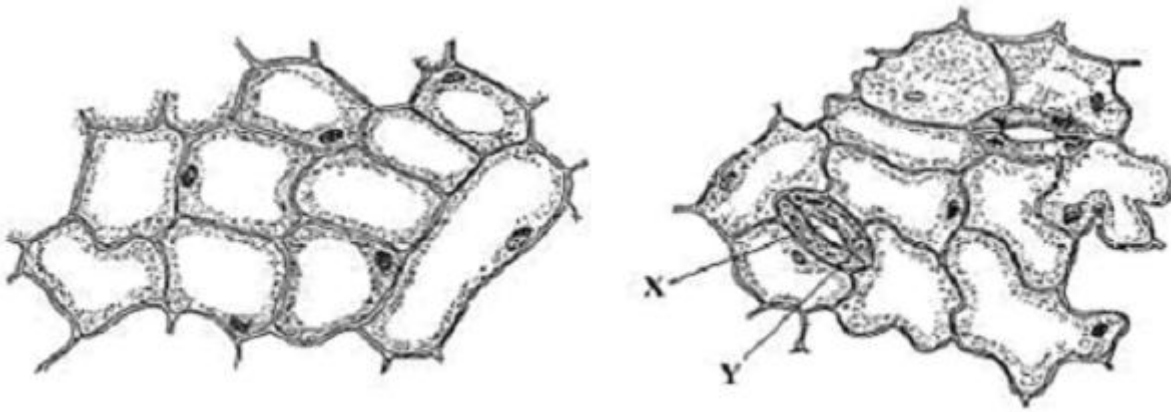


Diagram 2

(i) Name space **X** and cell **Y**.

X .....

Y .....

(2)

(ii) Use information in diagram **2** to explain why the results are different for leaves **B** and **C**.

.....

.....

.....

.....

(2)
(Total 6 marks)