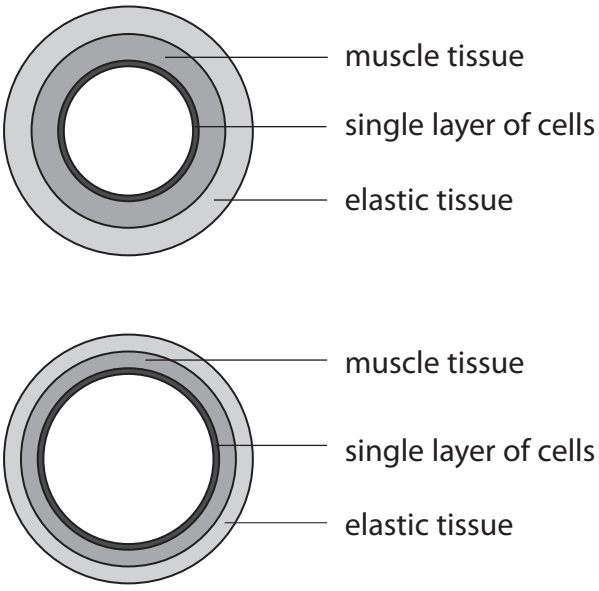
1 The diagrams show sections through an artery and a vein.



(a) Use the information in the diagrams and your own knowledge to give three ways in which the structure of an artery differs from the structure of a vein.

(3)

1 .....

.....

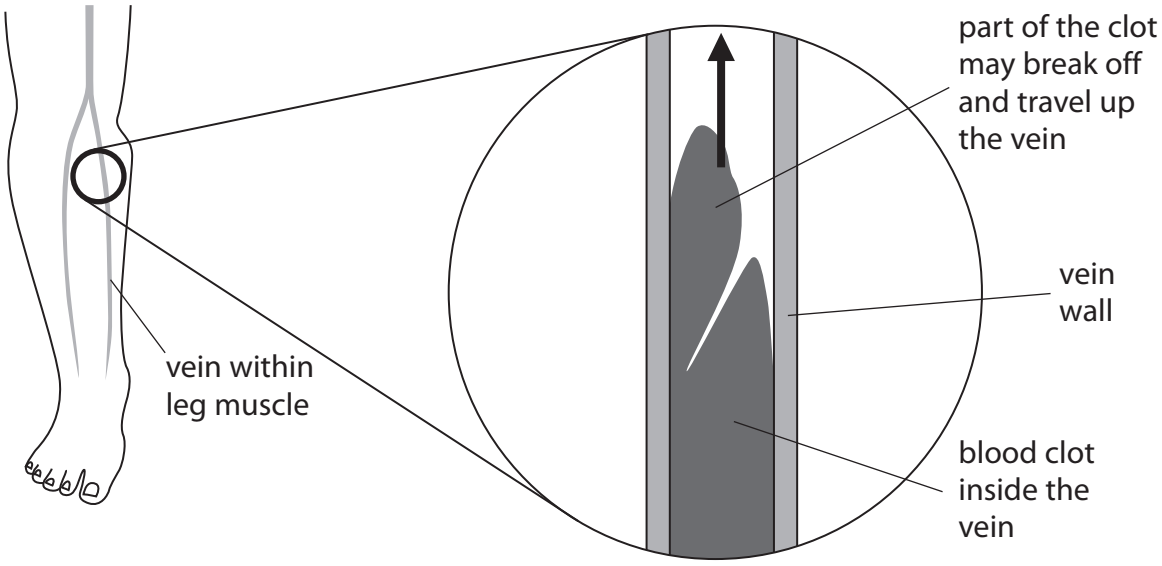
2 .....

.....

3 .....

.....

(b) Lack of movement by sitting still for long periods of time makes blood flow very slowly in a vein. Blood that flows slowly is more likely to clot than blood that flows normally. This problem is known as deep vein thrombosis (DVT). In DVT, the clot usually occurs in a leg vein as shown in the diagram.



DVT is dangerous because sometimes part of the clot breaks off and travels to the lung, blocking small blood vessels and causing death.

(i) Suggest why blood flow in a leg vein is slow when there is lack of movement.

(2)

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.....

.....

.....

(ii) Name the blood cells responsible for transporting oxygen.

(1)

.....

(iii) Suggest why a clot that blocks the small blood vessels in the lungs can cause death.

(2)

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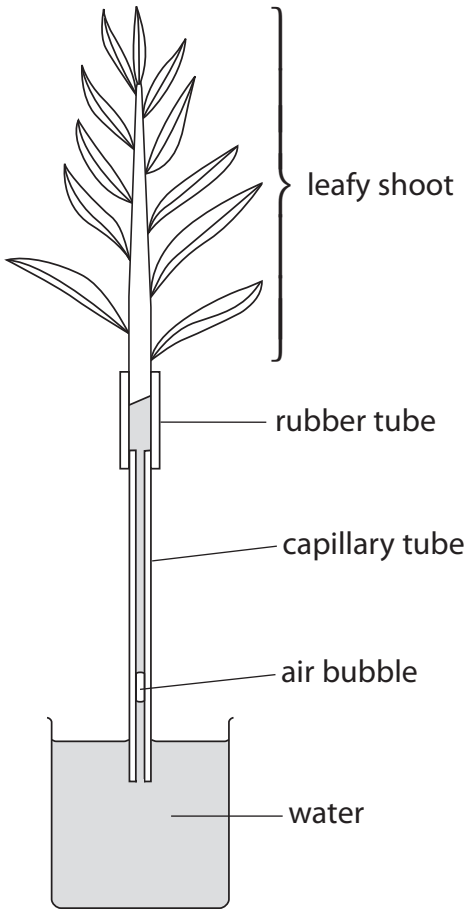
(Total for Question = 8 marks)

2 Steven wanted to measure the rate of water loss from a leafy shoot. He set up this apparatus in normal laboratory conditions.



(a) Name the apparatus Steven used.

(1)

.....

(b) Name the process by which a plant loses water.

(1)

.....

(c) Describe how Steven should set up the apparatus and how he should then use it to estimate the rate of water loss from the leafy shoot.

(4)

(d) Steven carried out three further experiments. He used the same plant, but changed one condition in each experiment.

The table shows the percentage change in rate of water loss for each condition when compared to Steven's original experiment.

Condition	Percentage change in rate of water loss (%)
wind increased	+23
light intensity reduced	–40
half of the leaves removed	–48

Explain the change in water loss when

(i) wind was increased

(2)

(ii) light intensity was reduced

(1)

(iii) half of the leaves were removed.

(2)

(e) Suggest how Steven could increase the wind around the leafy shoot.

(1)

(Total for Question = 12 marks)

3 The box shows the names of three blood vessels.

aorta	**capill y**	**ena cava**

(a) The table gives information about these blood vessels.

Complete the table by writing the name of the correct blood vessel in each empty box.

(2)

Name of blood vessel	Diameter of the lumen in mm	Thickness of the vessel wall in mm
	30.0	1.5
	0.006	0.001
	25.0	2.0

(b) (i) Which of these blood vessels carries blood containing the most oxygen?

(1)

.....

(ii) Which of these blood vessels carries blood at the lowest pressure?

(1)

.....

(iii) Which of these blood vessels is most suited for gas exchange?

Explain your answer.

(2)

.....

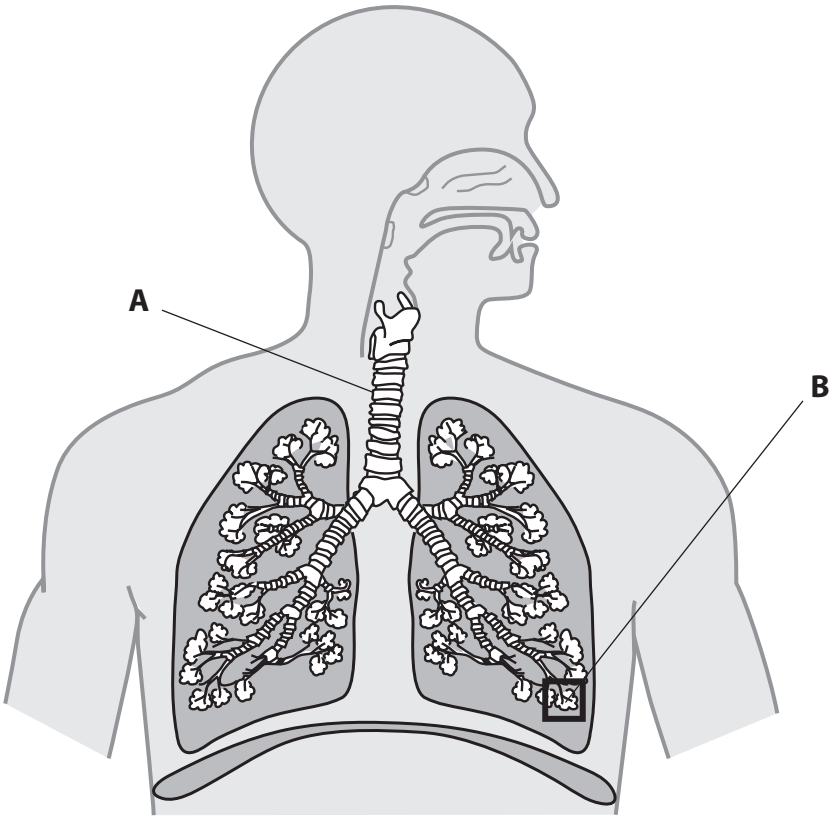
.....

.....

.....

(Total for Question = 6 marks)

4 The diagram shows some structures in the human breathing system.



(a) Name structures **A** and **B**.

(2)

A .....

B .....

(b) The table shows the level of two gases, **X** and **Y**, in blood entering and leaving the lungs during the process of gas exchange.

Gas	Level of gas in cm^3 per 100 cm^3 of blood	
	Blood entering lungs	**Blood leaving lungs**
X	10.6	19.0
Y	58.0	50.0

(i) Name the two gases.

(2)

gas **X** .....

gas **Y** .....

(ii) How much of gas **X** enters 100 cm^3 of blood, before the blood leaves the lungs?

(1)

..... cm^3

(iii) What term is used to describe how the process of gas exchange takes place?

Put a cross ☒ in the box to indicate your answer.

(1)

☒ **A** active transport

☒ **B** diffusion

☒ **C** transpiration

☒ **D** osmosis

(Total for Question = 6 marks)

5 The table shows the number of deaths in the United Kingdom in 2010 caused by cancer, lung diseases and circulatory diseases. The table also shows the number of these deaths caused by smoking.

Cause of death	Total number of deaths	Number of these deaths caused by smoking
cancer	66 000	38 000
lung diseases	46 000	22 000
circulatory diseases	138 000	20 000

(a) (i) What is the total number of deaths caused by all three diseases?

(1)

.....

(ii) Calculate the percentage of the total number of deaths that are caused by smoking.

Show your working.

(2)

percentage ..... %

(b) Chemicals in cigarette smoke cause mutations in cells which can lead to cancer.

What is meant by the term **mutation**?

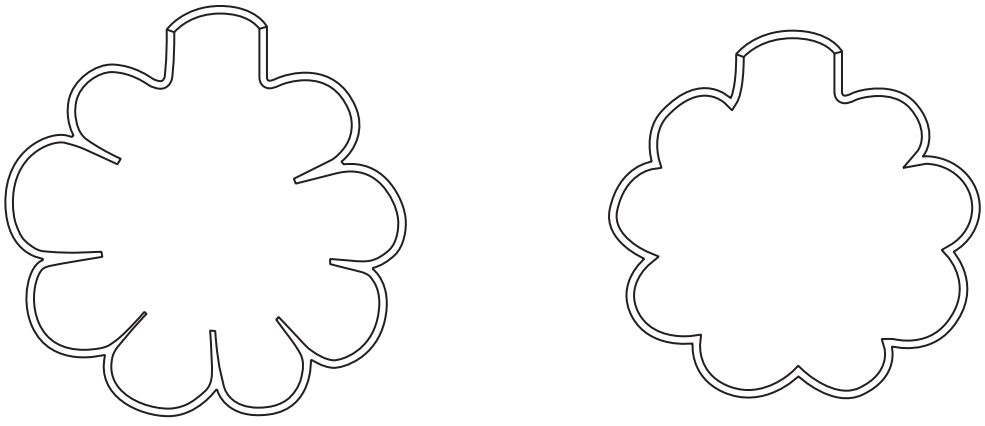
(2)

.....

.....

.....

(c) Emphysema is a lung disease that is usually caused by smoking. The diagram shows a cross section through two alveoli X and Y. Alveolus X is from a non-smoker and alveolus Y is from a smoker suffering from emphysema.



X Y

Use the diagram to suggest and explain the effect of emphysema on gas exchange.

(2)

(d) Smoking can increase the risk of developing coronary heart disease.

Explain how coronary heart disease can cause death.

(5)

(Total for Question = 12 marks)