Q1.

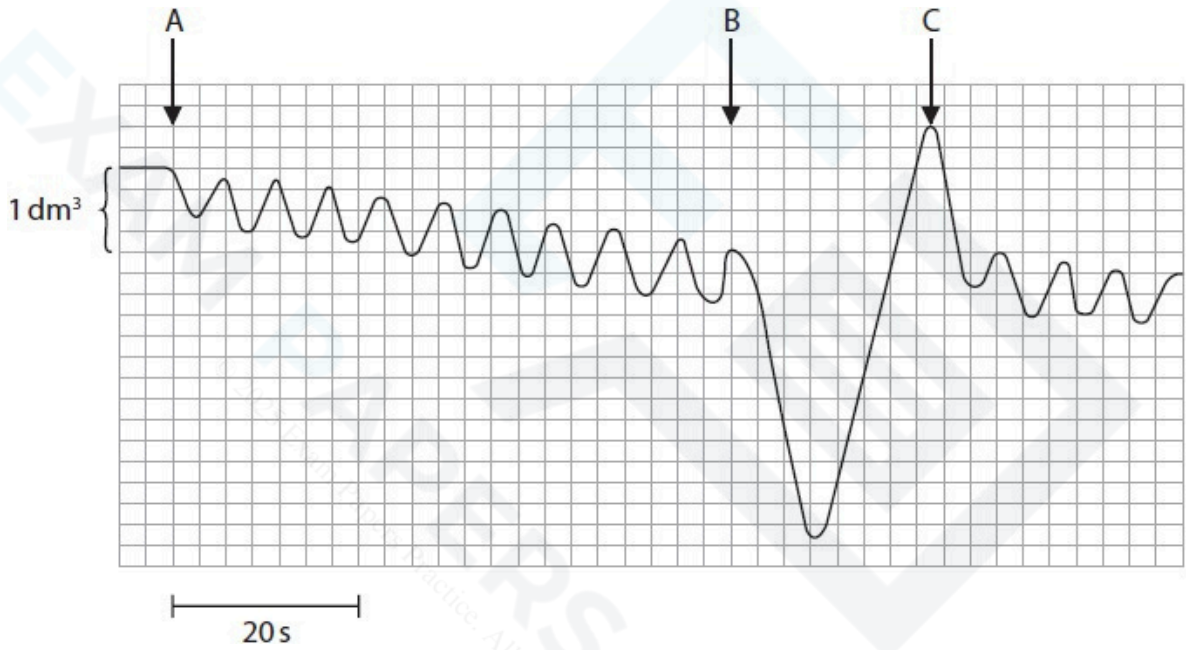
Aerobic respiration is the process that releases energy for use in the body.

(a) Give the word equation for the process of aerobic respiration.

(4)

..... + ... → ..... +
..... + energy

(b) A spirometer is used to measure the volumes of air breathed in and the volumes of air breathed out.
The spirometer trace shows the readings taken of a person at rest.



(i) Calculate the rate of breathing between points A and B shown on the trace.

(2)

rate = ... breaths per minute

(ii) Calculate the difference in the volume of air breathed in and the volume of air breathed out between points
B and C.

(3)

difference in volume = ... dm3

(c) Describe the differences that would be seen in the trace between points A and B if the person had been exercising
vigorously before the readings were taken.

(2)

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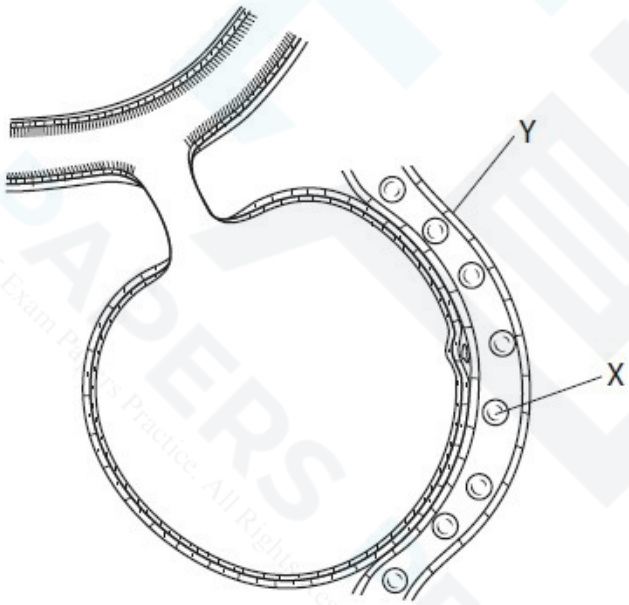
(Total for question = 11 marks)

Q2.

The diagram shows an alveolus and its blood supply.



(a) (i) What is the name of blood component X?

(1)

☒ **A** plasma

☒ **B** platelet

☒ **C** red blood cell

☒ **D** white blood cell

(ii) State three ways in which air in the alveolus differs from air in the atmosphere.

(3)

1 .....

.....

2 .....

.....

3 .....

.....

(iii) Give three features of alveoli that allow efficient gas exchange.

(3)

1 .....

.....

2 .....

.....

3 .....

.....

(b) Structure Y is a capillary. Give two features in the diagram which show that structure Y is a capillary.

(2)

1 .....
.....
2 .....
.....

(c) Some people have a condition known as emphysema. One symptom of emphysema is the breakdown of elastic fibres in the lung tissue.

Suggest the effects that loss of elastic fibres have on a person's ability to breathe.

(2)

.....
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.....
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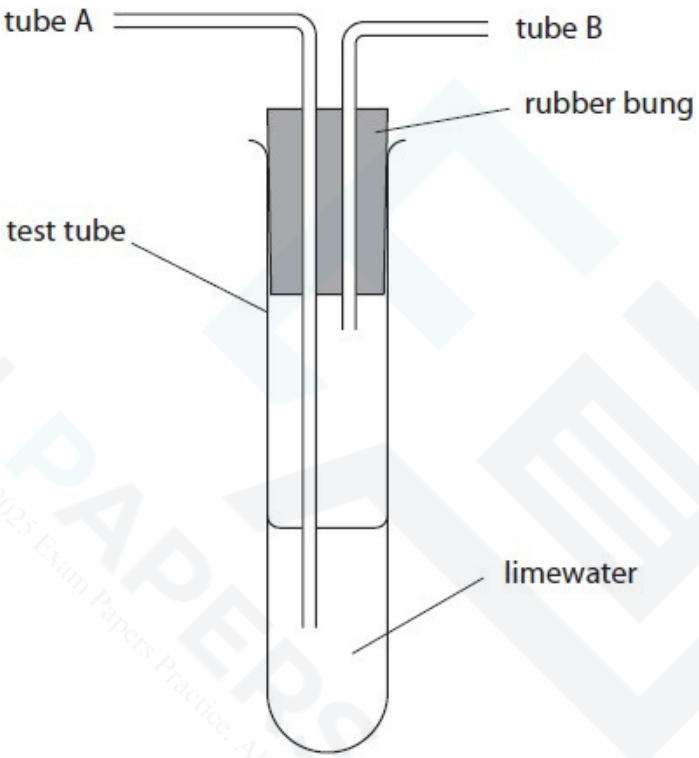
(Total for question = 11 marks)

Q3.
The amount of carbon dioxide in inhaled air is different from the amount of carbon dioxide in exhaled air.
The diagram shows a piece of apparatus that can be used to investigate this difference.



(a) (i) Describe how this apparatus should be used to compare the amount of carbon dioxide in inhaled and exhaled air.

(4)

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(ii) Explain the difference expected between the results.

(3)

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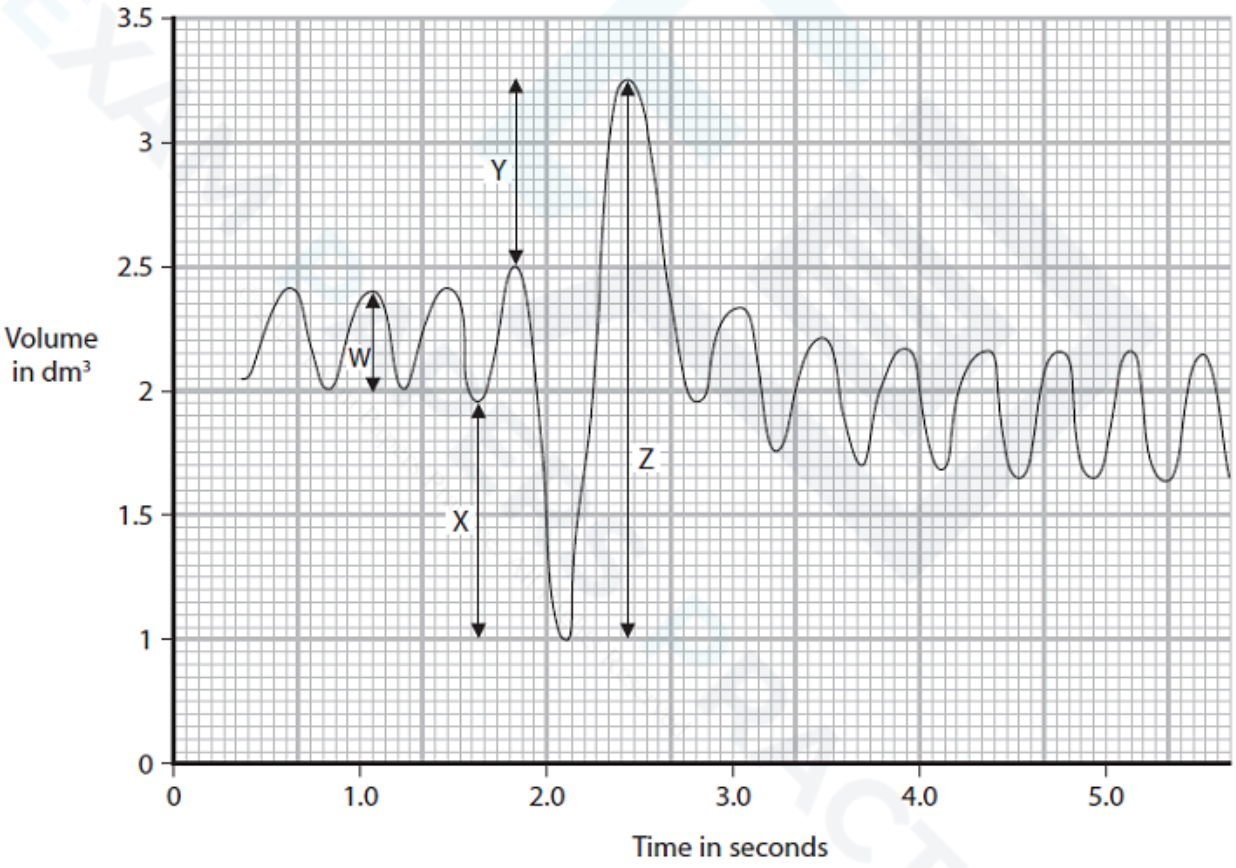
.....

(b) The movement of air in and out of the lungs can be measured using a spirometer. The diagram shows a trace produced by a spirometer.



(i) Complete the table using the correct letters from the trace to show the tidal volume, the vital capacity and the volume of air in each case.

(4)

Lung volume	Letter	Volume in dm³
tidal volume		
vital capacity		

(ii) Explain the pattern of breathing occurring to give lung volume Z.