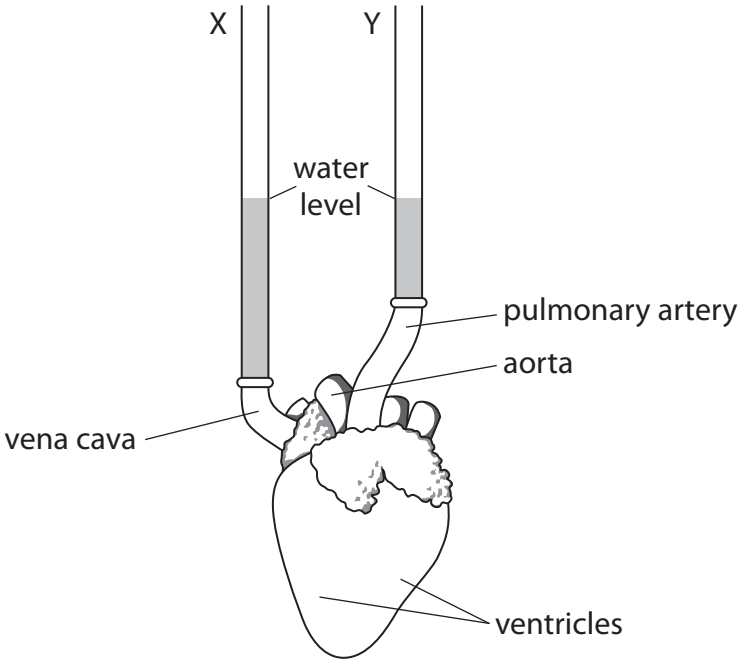
3 The diagram shows a mammal heart with glass tubes, X and Y, securely attached to the vena cava and the pulmonary artery. Water was poured into tube X, and rose up tube Y until both tubes were filled to the level shown.



(a) When water was poured into tube X, two chambers in the heart were filled with water.

Name these two chambers.

(2)

1 .....

2 .....

(b) The ventricles were squeezed once by hand.

(i) Suggest what would happen to the level of water in tube X and in tube Y when the ventricles were squeezed.

(1)

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(ii) Explain why no water came out of the aorta when the ventricles were squeezed.

(1)

.....

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(Total for Question = 4 marks)

4 (a) The table lists some structures that provide a large surface area for the diffusion of substances.

Complete the table by naming the organ in which each structure is found.
The first one has been done for you.

(3)

Structure	Organ
spongy mesophyll	leaf
alveolus	
nephron	
villus	

(b) What is meant by the term **diffusion**?

(2)

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(c) The nephron is involved in the removal of substances from the blood.

Describe how substances are removed from the blood into the nephron.

(2)

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(Total for Question = 7 marks)

3 Ian wanted to investigate how gas exchange in a flowering plant changed with light intensity.

He set up an experiment using four tubes. Each of the tubes contained orange hydrogencarbonate indicator solution and was sealed with a cork. Ian added a fresh leaf to tubes A, B and C. Tube D had no leaf.

The tubes were then left in the following conditions:

- Tube A was placed in direct sunlight.
- Tube B was covered with aluminium foil to prevent any light entering the tube.
- Tube C was covered with thin cloth which allowed some light to enter the tube.
- Tube D was also placed in direct sunlight.

He left the tubes in the laboratory for one hour and then returned to look at the colour of the indicator solution in the tubes.

(a) Suggest a hypothesis for Ian's investigation.

(2)

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(b) Give **two** variables that Ian should keep constant in his investigation.

(2)

1 .....

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2 .....

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(c) State the purpose of Tube D in the investigation.

(1)

(d) Ian recorded his results in a table.

Tube	Colour of indicator at start	Colour of indicator after one hour
A	orange	purple
B	orange	yellow
C	orange	orange
D	orange	orange

(i) Explain the change in colour of the indicator in Tube A.

(2)

(ii) Explain the change in colour of the indicator in Tube B.

(2)

(e) Suggest why the indicator did not change colour in:

(i) Tube C

(1)

(ii) Tube D

(1)

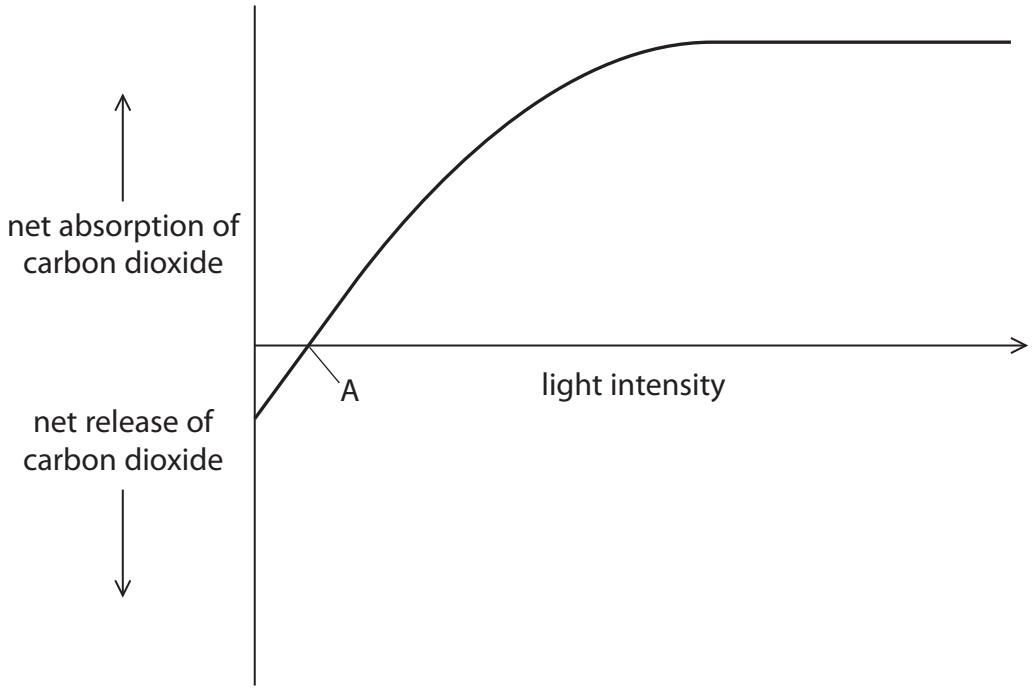
(f) Limewater is an indicator that can be used to show an increase in the level of carbon dioxide.

Suggest why it would **not** be a suitable indicator for use in this investigation.

(1)

(Total for Question = 12 marks)

4 The graph shows the effect of increasing light intensity on the exchange of carbon dioxide in a green plant.



(a) Describe the effect of increasing light intensity on the exchange of carbon dioxide.

(2)

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(b) Explain why there is no net exchange of carbon dioxide at point A.

(1)

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(c) Describe how you could use an indicator to show how the exchange of carbon dioxide by a leaf changes in the dark and in the light.

(2)

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(Total for Question = 5 marks)