Practice Question Set For A-Level
Subject : Biology
Paper-1 Topic:3 Organism and substance exchange

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Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Q1.

(a) Explain how each of the following is related to the function of xylem tissue.

(i) Xylem tissue contains hollow tubes.

_____

_____

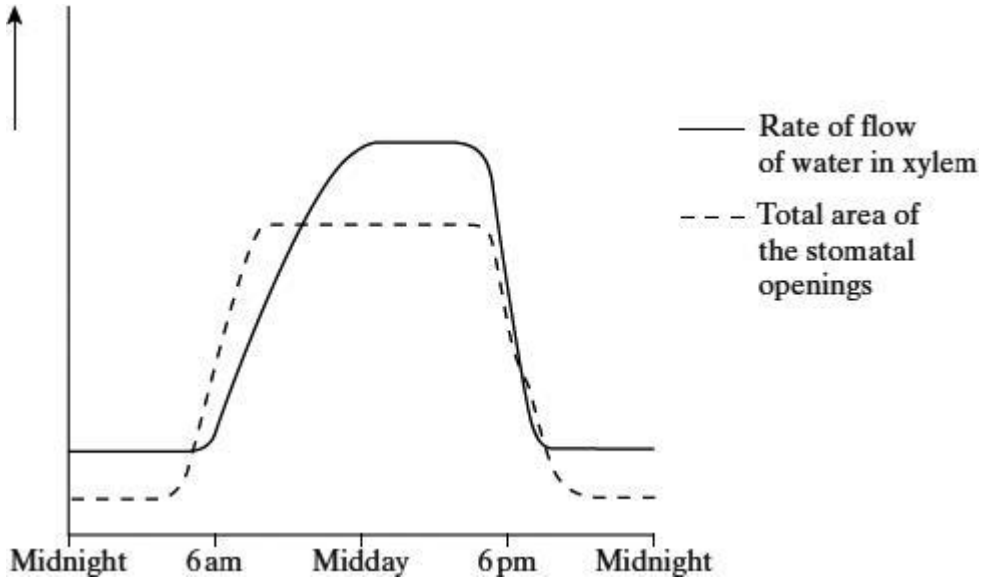
(ii) Lignin is present in xylem cell walls.

_____

_____

(2)

(b) In an investigation the total area of the stomatal openings and the rate of flow of water through xylem were measured in a plant over a period of 24 hours. The results are shown in the graph.



(i) Describe the relationship between the rate of flow of water and the total area of the stomatal openings for the period of time between midday and midnight.

_____

_____

(1)

(ii) Between 8 am and midday the rate of flow of water continues to rise although the total

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area of the stomatal openings remains constant. Explain why the rate of flow of water rises.

_____

(1)

(iii) How would the curve showing the total area of the stomatal openings differ if the investigation was repeated on a dull day?

_____

_____

(1)

(c) Some xerophytic plants have sunken stomata. Explain the advantage of this adaptation.

_____

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_____

_____

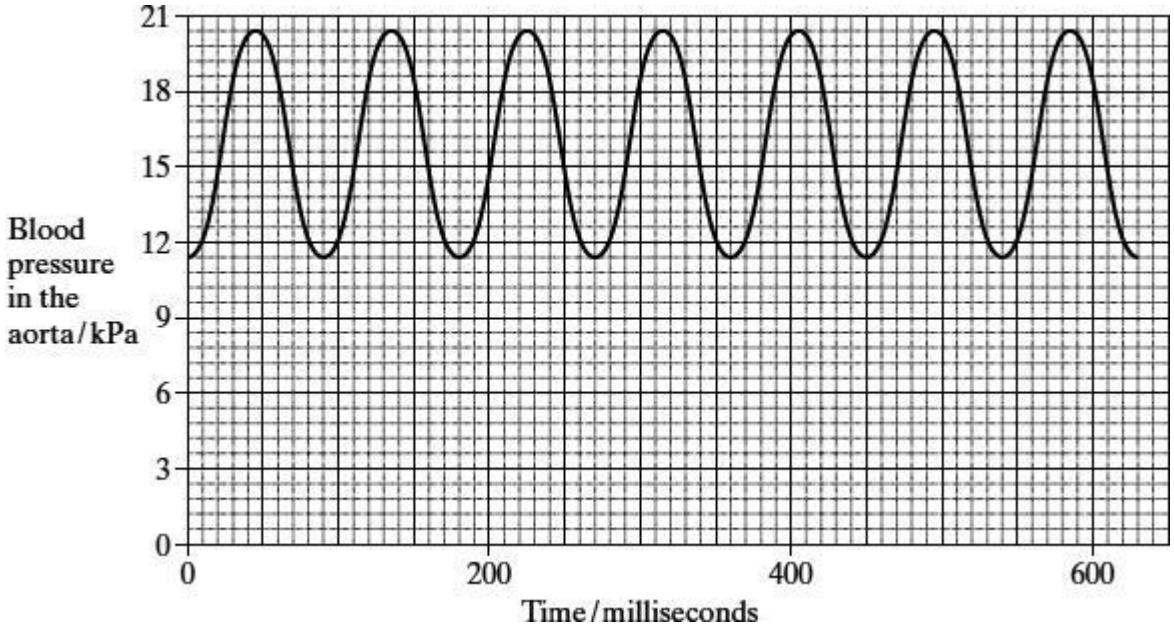
(2)

(Total 7 marks)

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Q2.

The graph shows the changes in pressure which take place in the aorta of a mouse during several heartbeats.



(a) Which chamber of the heart produces the increase in pressure recorded in the aorta?

_____

(1)

(b) The pressure of blood in the aorta decreases during each heartbeat but does not fall below 10 kPa. Explain what causes the pressure of blood to

(i) decrease during each heartbeat;

_____

_____

(1)

(ii) stay above 10 kPa.

_____

_____

_____

_____

(2)

(c) The heart rate of a mouse is much higher than the heart rate of a human. Use the graph to calculate the heart rate of the mouse. Show your working.

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Heart rate = _____ beats per minute

(2)

(d) The cardiac output is the volume of blood pumped by a heart in one minute. The stroke volume is the volume of blood pumped by a heart in a single heartbeat.

cardiac output = stroke volume × heart rate

The cardiac output for a mouse with a heart rate of 550 beats per minute is 16.6 cm^3 per minute. Calculate the stroke volume for this mouse. Show your working.

Stroke volume = _____ cm^3

(2)

(Total 8 marks)

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Q3.

(a) Describe how air is taken into the lungs.

_____

_____

_____

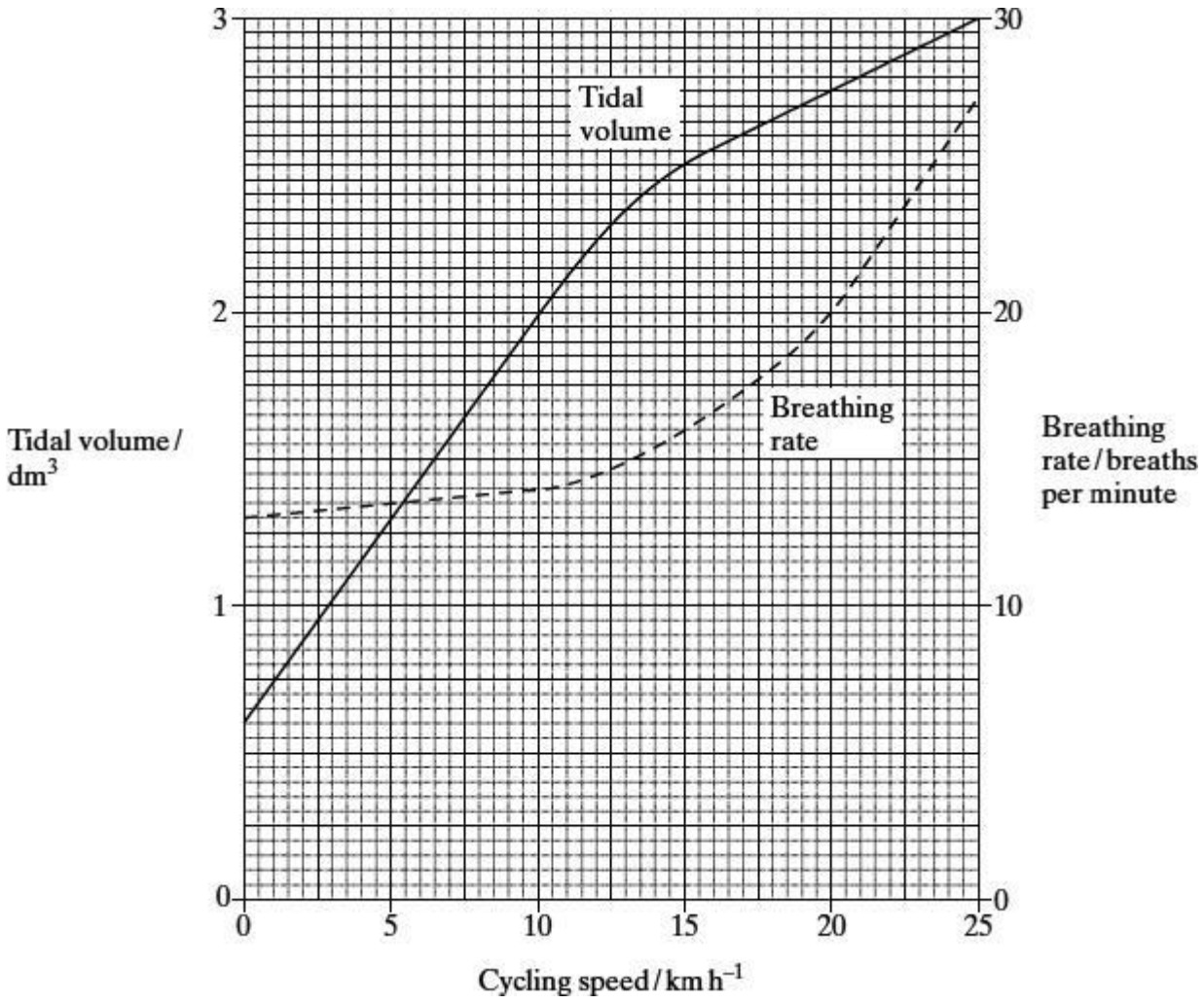
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(3)

The volume of air breathed in and out of the lungs during each breath is called the tidal volume. The breathing rate and tidal volume were measured for a cyclist pedalling at different speeds. The graph shows the results.



(b) Describe the **two** curves.

(i) Tidal volume

_____

_____

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(ii) Breathing rate

(2)

(c) Calculate the total volume of air breathed in and out per minute when the cyclist is cycling at 20 km h^{-1}. Show your working.

_____ dm^3

(2)

(Total 7 marks)

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