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 : 26 Marks **Time : 26 Minutes**

Q1.

(a) The table shows the transpiration rate of a group of plants exposed to different humidities at a temperature of 25°C.

Humidity / %	Transpiration rate / arbitrary units
20	26.0
40	21.0
50	16.5
60	11.0
70	9.5

Describe and explain the relationship between humidity and transpiration rate.

_____

_____

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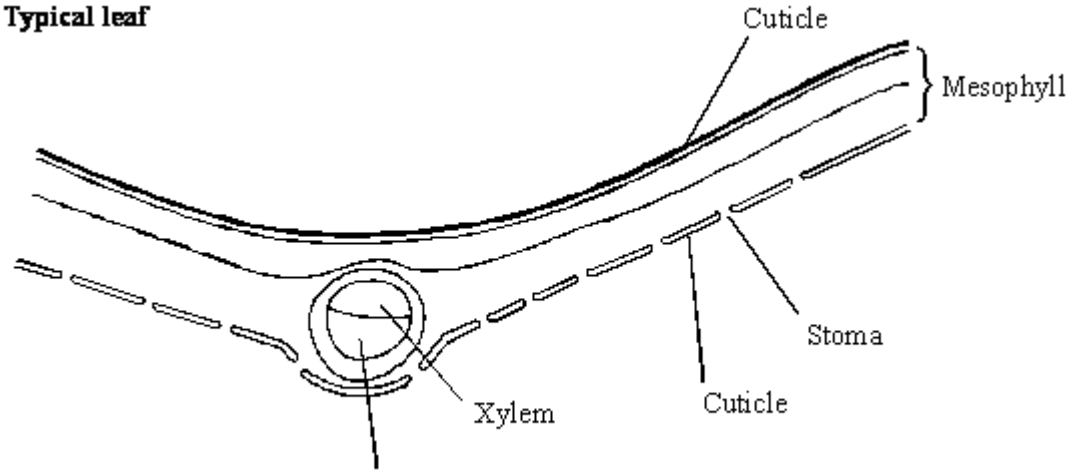
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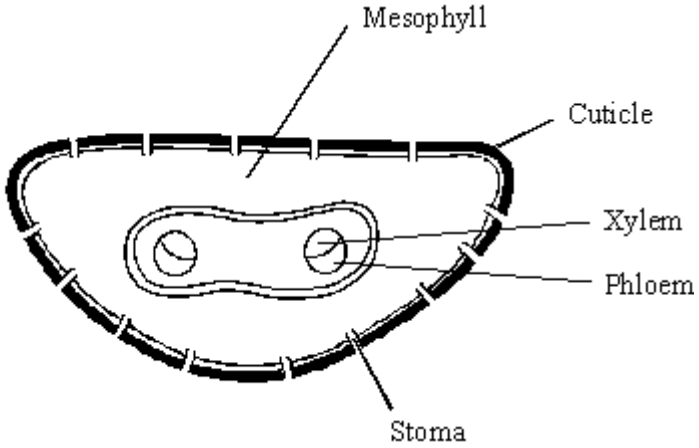
(b) The diagrams show a section through a typical leaf and a section through a leaf from a xerophytic plant. The xerophytic leaf has a lower transpiration rate than the typical leaf.

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Typical leaf



Xerophytic leaf



Describe **two** features shown in the diagram of the xerophytic leaf which reduce transpiration rate. Explain how each of these features contributes to a lower transpiration rate.

Feature 1_____

Explanation _____

_____

Feature 2_____

Explanation _____

_____

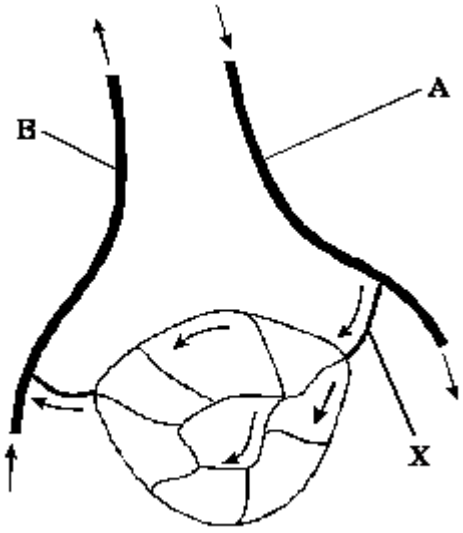
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(Total 7 marks)

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Q2.

The diagram shows some blood vessels in muscle tissue.



Not drawn to scale

(a) (i) Which type of blood vessel is **X**?

_____

(1)

(ii) Name **two** substances which are at a higher concentration in the blood at **A** than in the blood at **B**.

1. _____

2. _____

(1)

(b) The table shows the mean diameter of the lumen and the rate of blood flow in some types of human blood vessel.

Type of blood vessel	**Mean diameter of lumen / μm**	**Rate of blood flow / cm s^{-1}**
Artery	400	10 – 40
Arteriole	30	0.1 – 10
Capillary	8	less than 0.1

Using information in the table, explain what causes the rate of blood flow to be slower in capillaries than in other vessels.

_____

_____

_____

_____

(2)

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(c) (i) Which type of blood vessel has most elastic tissue in its wall?

_____

(1)

(ii) How does this elastic tissue help to smooth out the flow of blood in the blood vessel?

_____

_____

_____

_____

(2)

(Total 7 marks)

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Q3.

This question should be written in continuous prose, where appropriate.
Quality of Written Communication will be assessed in the answer.

(a) Explain how the ventilation mechanism of a fish and the structure of its gills result in the efficient uptake of oxygen from water.

(6)

Table 1 compares some features of water and air.

Feature	Water	Air
Relative density	1000	1
Maximum concentration of oxygen / $cm^3\ dm^{-3}$	9	130

Table 1

Table 2 shows some features of gas exchange in a fish and in a mammal.

Feature	Fish	Mammal
Percentage of oxygen extracted from water or air	80	25
Oxygen consumption at rest / $cm^3\ kg^{-1}\ hour^{-1}$	100	200

Table 2

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(b) (i) The fish has a body mass of 0.2 kg. Calculate the volume of water it will need to pass over its gills each hour to supply the oxygen required when resting. Show your working.

Answer _____ dm^3 / $hour^{-1}$

(2)

(ii) Ventilation in mammals involves movement of air to and from the gas exchange surface in a tidal pattern. Using information in the tables, explain why it is easier to move water over the gas exchange surface of a fish in one direction rather than in a tidal pattern.

_____

_____

_____

_____

(2)

(c) A rise in the temperature of water decreases the amount of oxygen dissolved in the water. As the water temperature rises, the rate of ventilation in a fish also rises. Explain the advantage of this.

_____

_____

_____

_____

(2)

(Total 12 marks)

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