Structure of transport tissues

Question Paper 3

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Transport in plants
Sub Topic	Structure of transport tissues
Booklet	Theory
Paper Type	Question Paper 3

Time Allowed : **64 minutes**

Score : **/ 53**

Percentage : **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 Fig. 5.1 is a light micrograph of some unicellular photosynthetic organisms called *Chlamydomonas*.

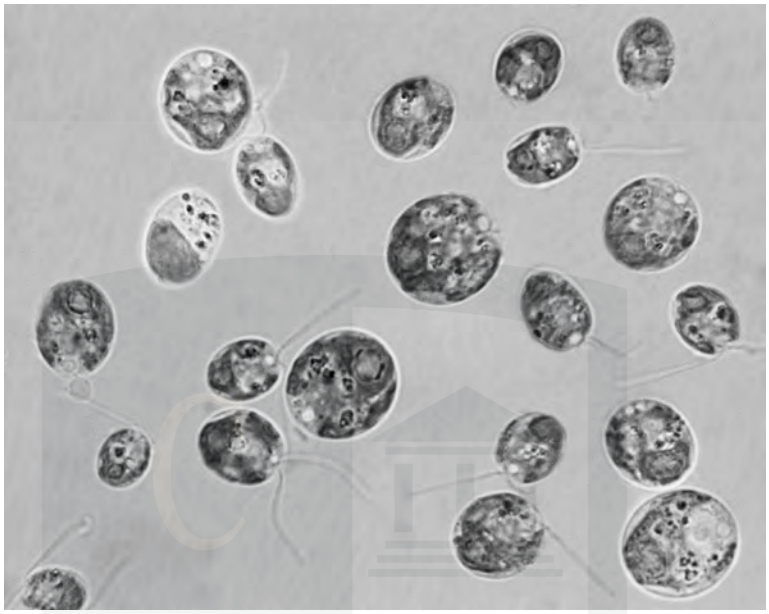

Fig. 5.1

(a) *Chlamydomonas* moves through water.

Explain why the light microscope rather than the electron microscope is used to observe the movement of *Chlamydomonas*.

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.....[2]

(b) *Chlamydomonas* live in water and obtain minerals, such as magnesium ions, from the water.

(i) State **one** role of magnesium ions in photosynthetic organisms.

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(ii) State two properties of water which make it possible for organisms such as *Chlamydomonas* to live in water.

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2 .....

.....[2]

(c) Explain why multicellular organisms require transport systems while unicellular organisms, such as *Chlamydomonas*, do not.

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(d) Some plants, such as the banana plant, *Musa acuminata*, produce fruit. The banana fruit has a high content of carbohydrate.

Describe how sugars are transported in phloem sieve tubes from source to sink in plants such as *M. acuminata*.

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.....[5]

[Total: 14]

2 B-lymphocytes respond to the presence of a non-self antigen by dividing as shown in Fig. 4.1.

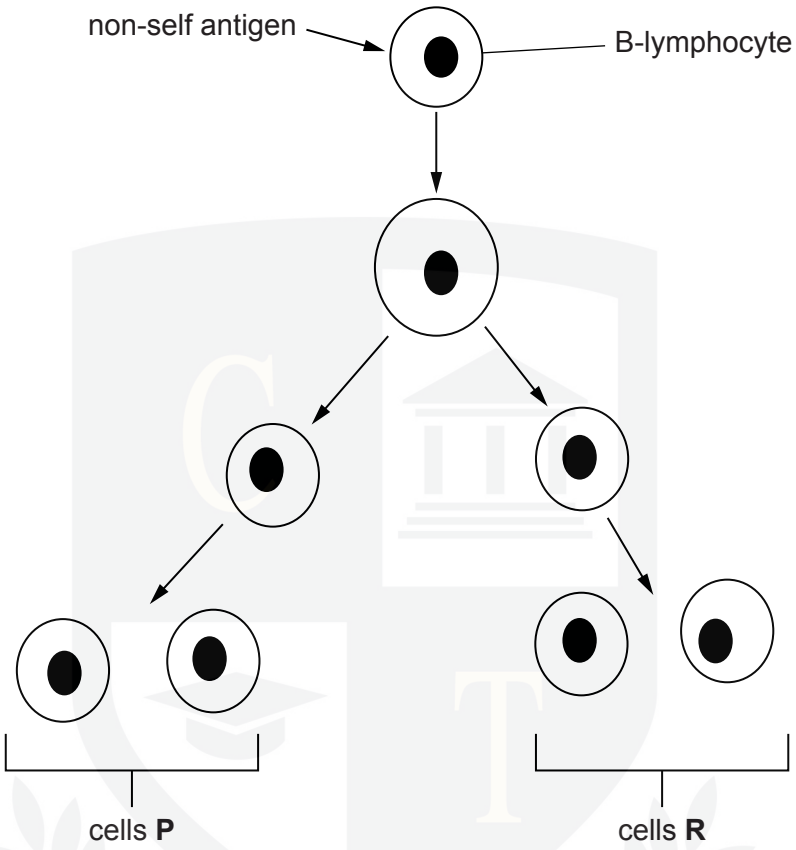

Fig. 4.1

(a) (i) Explain what is meant by the term *non-self antigen*.

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(ii) Outline how B-lymphocytes recognise non-self antigens.

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The cells labelled **P** on Fig. 4.1 continue to divide to give rise to many cells that differentiate into short-lived plasma cells. The plasma cells release antibody molecules.

(b) (i) Outline how plasma cells produce antibody molecules.

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(ii) Describe how antibody molecules are released from the plasma cell.

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(c) The cells labelled **R** on Fig. 4.1 divide to give more cells that do not differentiate into plasma cells. These cells have an important role in the immune system.

Explain the role of these cells.

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..... [3]

The mass of DNA in the cells shown in Fig. 4.1 was determined. The results are shown in Fig. 4.2.

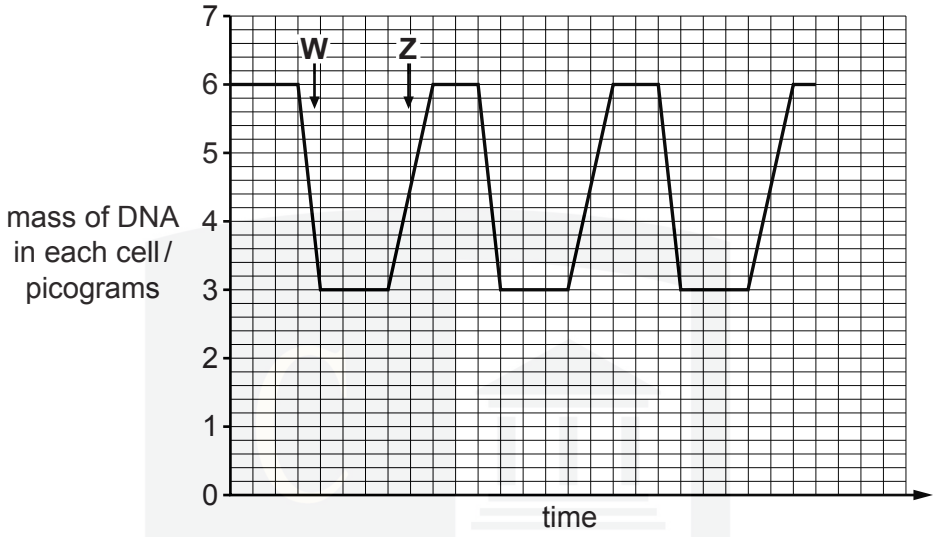

Fig. 4.2

(d) State what happens at **W** and **Z** to change the mass of DNA in each cell.

W .....

Z .....

[2]

(e) Acute lymphoblastic leukaemia (ALL) is a cancer of B-lymphocytes. It is very rare in adults, but more common in children. A study in 2009 found that exposure to tobacco smoke in the home may put children at risk of developing ALL.

Suggest how smoking by adults in the home may put their children at risk of cancers, such as ALL.

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[Total: 18]

3 Fig. 2.1 is a transmission electron micrograph of cells from a spinach leaf.

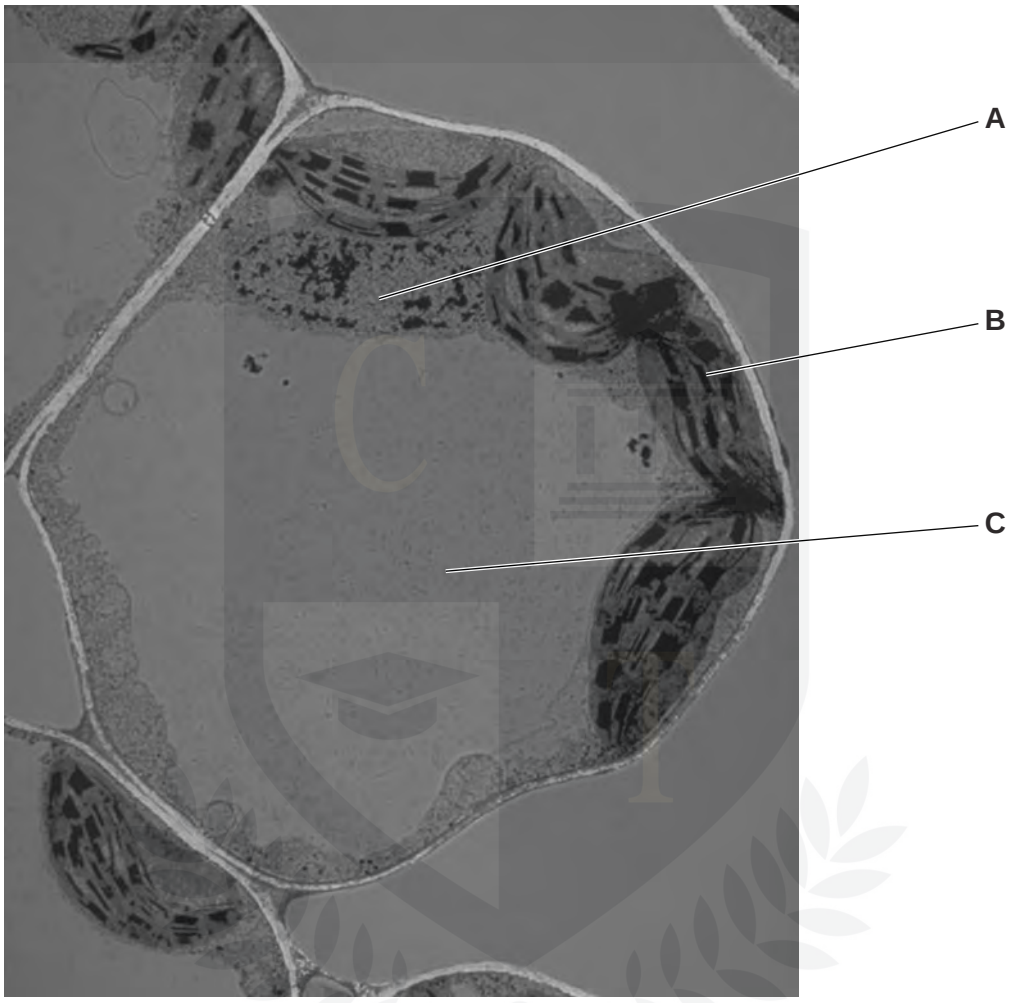

Fig. 2.1

(a) Name the organelles **A**, **B** and **C**.

A .....

B .....

C .....

[3]

(b) List two cell structures that could be present in animal cells that are not present in plant leaf cells.

1. .....

2. .....

[1]

(c) Water is transported up the stem, to the spinach leaf, in the xylem. Once it leaves the xylem it moves via the apoplast and symplast pathways, to reach the cells in Fig. 2.1.

Outline the differences between the apoplast and symplast pathways after the water has left the xylem.

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(d) Water, containing dissolved mineral ions such as magnesium, enters spinach leaf cells.

(i) State **two** ways that water is used in the leaf cell.

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[2]

(ii) State **one** role of magnesium ions in the leaf cell.

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[Total: 11]

4 Fig. 5.1 shows part of a transverse section of a leaf.

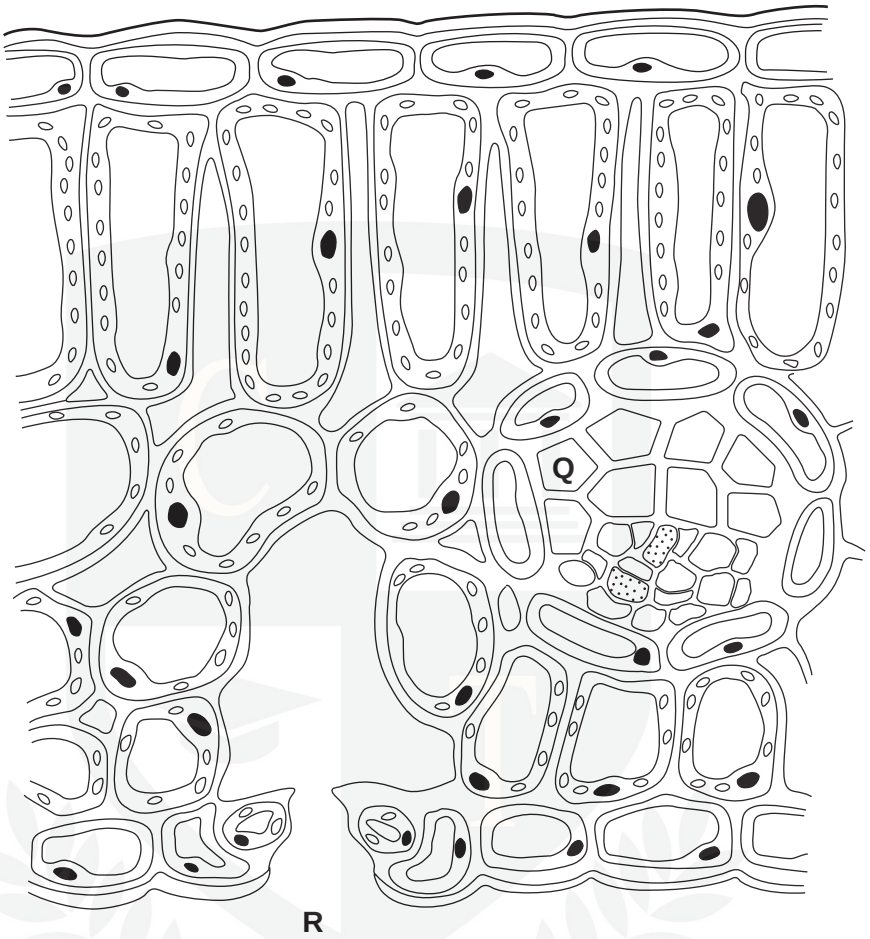

Fig. 5.1

(a) Explain, in terms of **water potential**, how water moves from **Q** to **R**.

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.....[4]

(b) State and explain three ways in which the **structure** of xylem vessels is adapted to transport water.

1. .....

explanation .....

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2. ....

explanation .....

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3. .....

explanation .....

.....[6]

[Total: 10]