

Transport in Plants

Question Paper 2

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Transport in Plants
Paper Type	(Extended) Theory Paper
Booklet	Question Paper 2

Time Allowed: 64 minutes

Score: /53

Percentage: /100

1 Fig. 4.1 shows a cross section of part of a stem of buttercup, *Ranunculus*.

Fig. 4.2 is an outline drawing of one vascular bundle from the stem of *Ranunculus*.

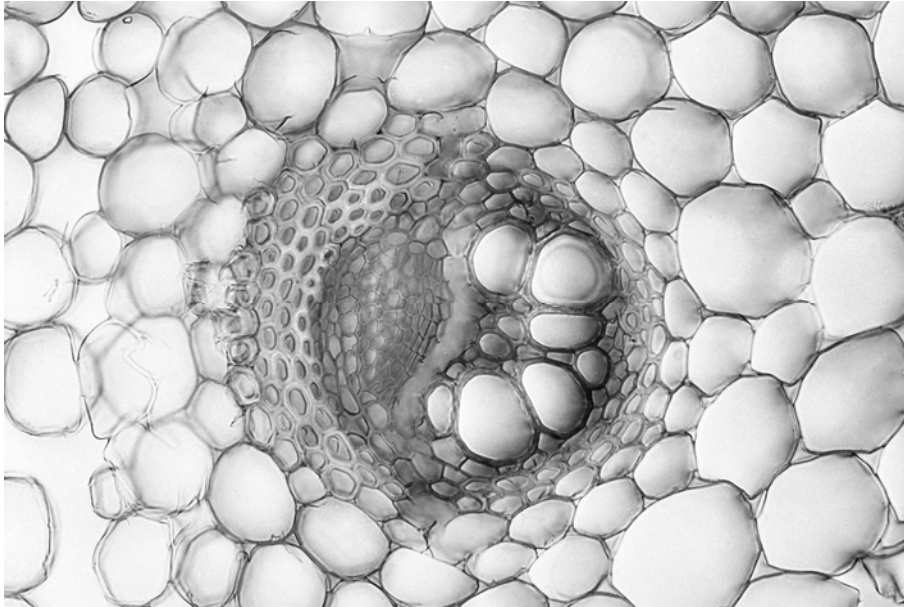


Fig. 4.1

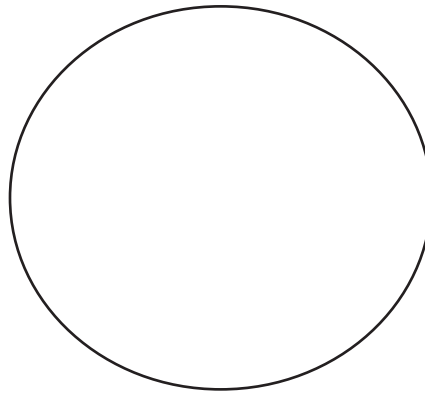


Fig. 4.2

(a) Draw **and** label the position of the xylem and the phloem in the outline of the vascular bundle in Fig. 4.2. [2]

(b) Name the carbohydrate that is transported in the phloem.

..... [1]

(e) The rattan palm is a plant that climbs on rainforest trees to heights of about 40 metres.

Explain how water is moved to the tops of tall plants, such as the rattan palm.

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..... [4]

[Total: 14]

2 This question is about transport in plants.

(a) Two pea plants, **D** and **E**, were supplied with substances containing the radioactive isotopes, carbon-14 (^{14}C) or phosphorus-32 (^{32}P), as shown in Fig. 4.1.

A leaf of plant **D** was exposed to radioactive carbon dioxide.

Plant **E** was placed into a solution containing radioactive phosphate ions.

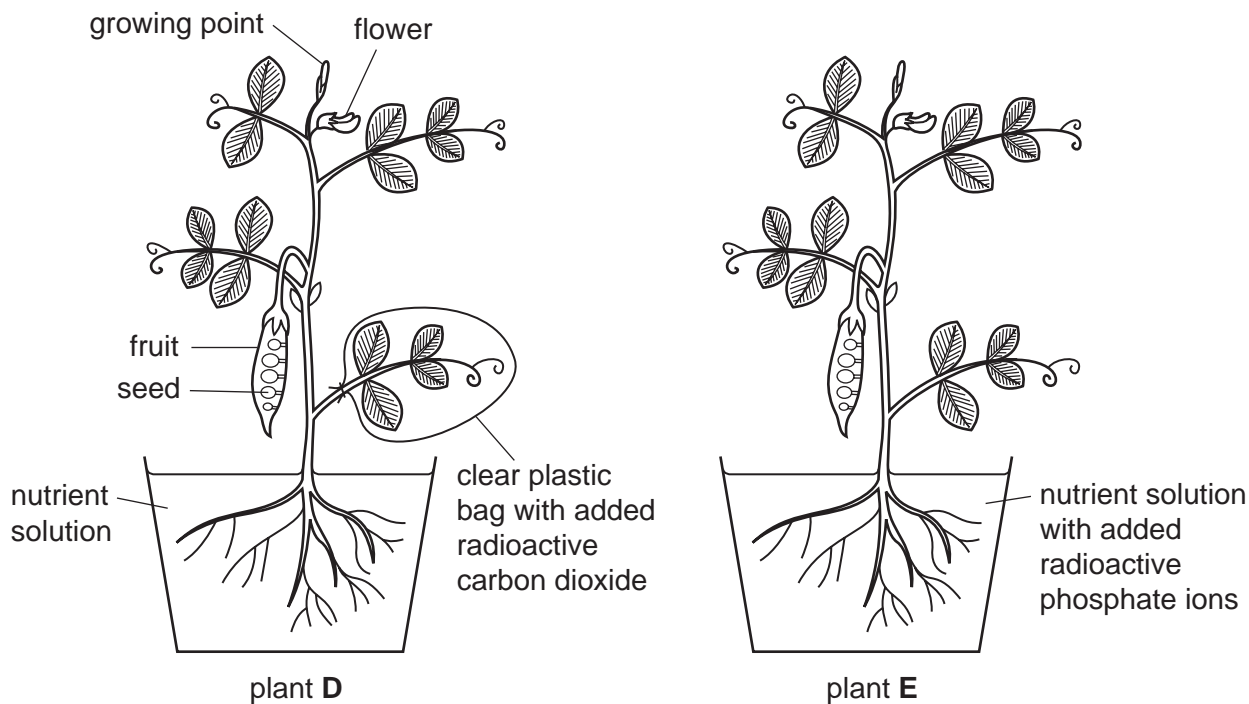


Fig. 4.1

After several hours the plants were analysed for the presence of the radioactive isotopes.

Sucrose containing ^{14}C was found throughout plant **D**.

Compounds containing ^{32}P were found throughout plant **E**.

Complete Table 4.1 to show:

- the tissue in which each substance is transported;
- **one** possible sink for each substance.

Table 4.1

pea plant	D	
substance transported	sucrose	ph ions
transport tissue		
sink		

(b) State **one** substance, **other than sucrose**, that is produced in leaves and translocated to other parts of the plant.

..... [1]

(c) Outline how sucrose is produced from carbon dioxide in pea plants.

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..... [3]

(d) State **two** uses of sucrose within a pea plant.

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2 [2]

(e) Explain how ions, such as phosphate ions, are absorbed by plant roots.

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..... [3]

[Total: 13]

3 (a) Define the term *growth*.

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..... [2]

Some students investigated the responses of tomato seedlings to receiving light from one side (unidirectional light).

The students germinated tomato seeds in the dark and then placed the seedlings in test-tubes with water. The seedlings were treated in four different ways, **E** to **H**, as shown in Fig. 2.1. The responses of the seedlings are shown in Fig. 2.2.

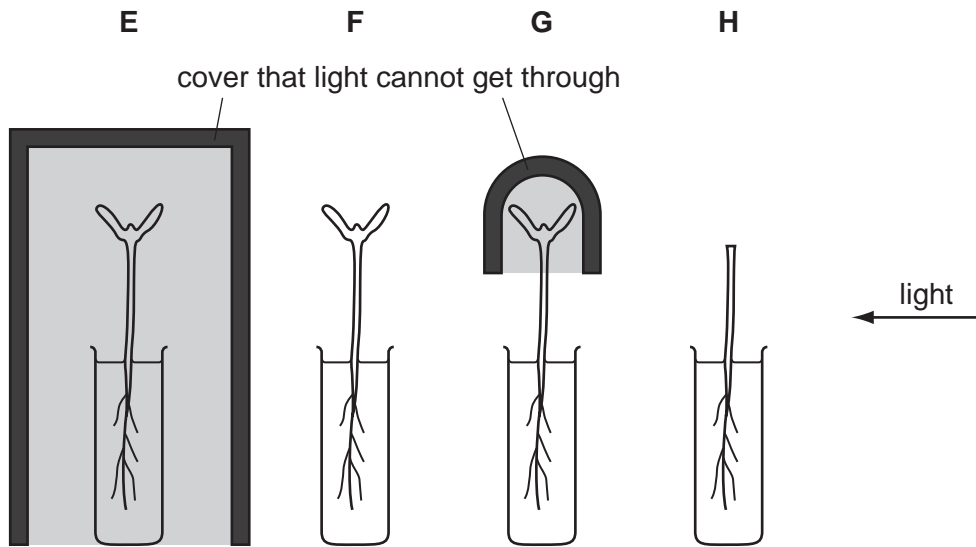


Fig. 2.1

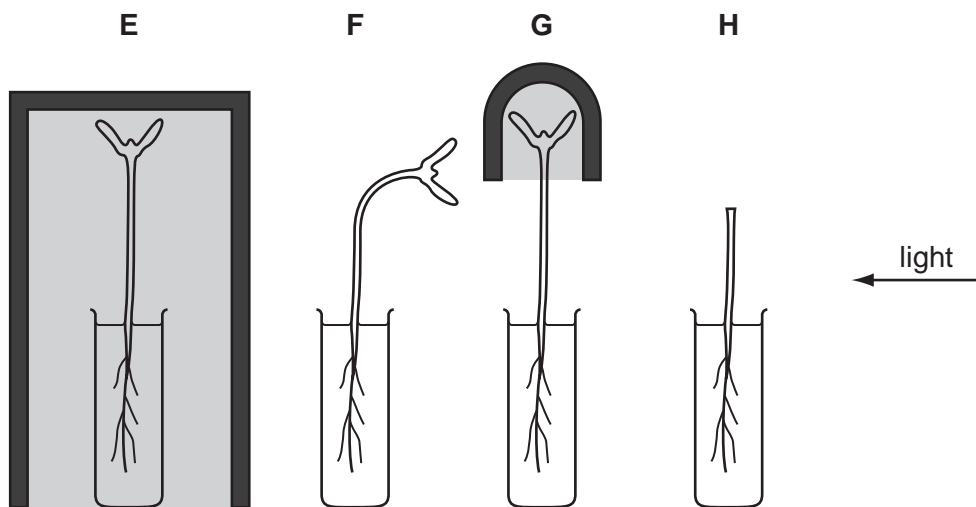


Fig. 2.2

(b) Name the response shown by the tomato seedling, **F**, which has bent 90° towards the light.

..... [2]

(c) Using the results shown in Fig. 2.2, suggest what conclusions may be made about how the tomato seedlings detected the stimulus of unidirectional light.
You may refer to the seedlings by the letters **E** to **H**.

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..... [3]

(d) Explain the advantage of the response shown by seedlings to unidirectional light.

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..... [2]

(e) Responses to light are coordinated by plant growth substances known as auxins.
Explain the role of auxins in coordinating the response.

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..... [2]

- (ii) Suggest an explanation for the differences between the responses of the two groups of seedlings.

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..... [2]

[Total: 17]

(b) Suggest why it may **not** be cost effective to maintain a high concentration of carbon dioxide in glasshouse **E** compared to the concentration of carbon dioxide in the atmosphere.

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..... [2]

(c) (i) Concentrations of carbon dioxide in all three glasshouses in Fig. 3.1 increased at night. State why this happened.

..... [1]

(ii) Explain why it is important to ventilate glasshouses by opening the windows.

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..... [4]

[Total: 9]