

Homeostasis in plants

Question Paper 2

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Homeostasis
Sub Topic	Homeostasis in plants
Booklet	Theory
Paper Type	Question Paper 2

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%

(c) Fig. 8.2 outlines the main reactions in the light-dependent stage of photosynthesis.

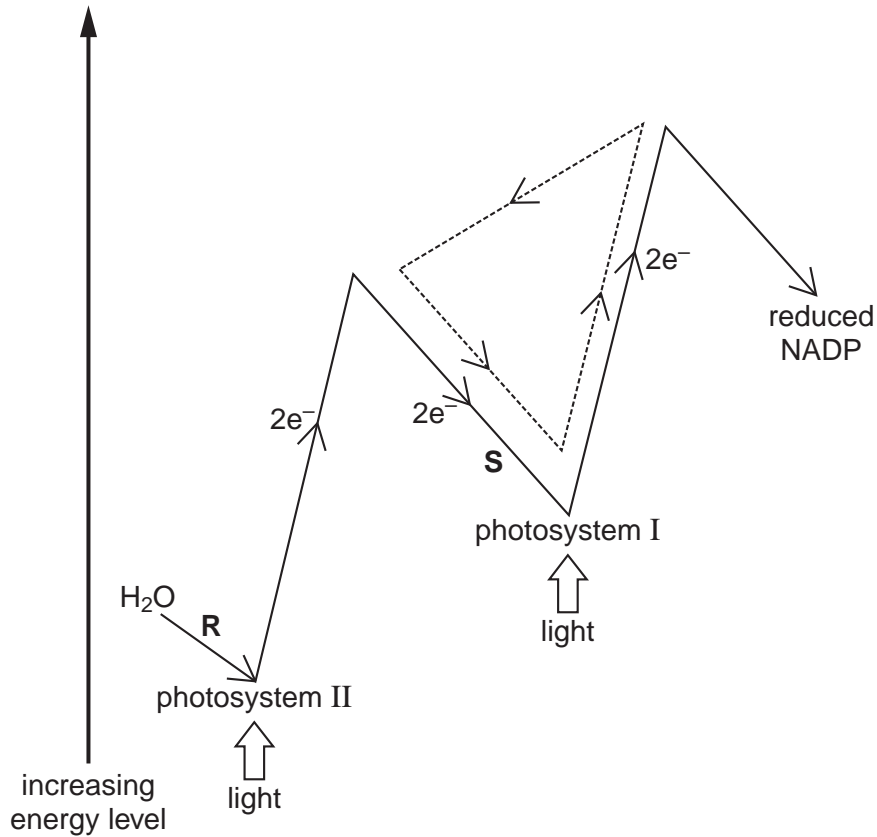


Fig. 8.2

(i) Name the process shown by the dotted arrows (----->-----).

..... [1]

(ii) Describe what happens to water at R.

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 [2]

(iii) State the product formed as electrons flow along S.

..... [1]

(iv) Explain briefly the role of reduced NADP in the **light-independent stage**.

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 [2]

2 Sorghum is a cereal crop that grows well in very dry (arid) conditions.

(a) Outline **two** structural features of sorghum that adapt it to survive in arid environments.

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..... [2]

(b) An investigation was carried out to measure the effect of lack of water on the leaves of sorghum plants.

- Several well-watered sorghum plants were kept in conditions of normal light and temperature.
- Watering was then stopped for 6 days, and resumed on day 7.
- The water potential of the cells in the leaves, the concentrations of abscisic acid in the leaves and stomatal resistance were measured each day.

A high stomatal resistance indicates that most stomata are partially or completely closed.

The results are shown in Fig. 3.1.

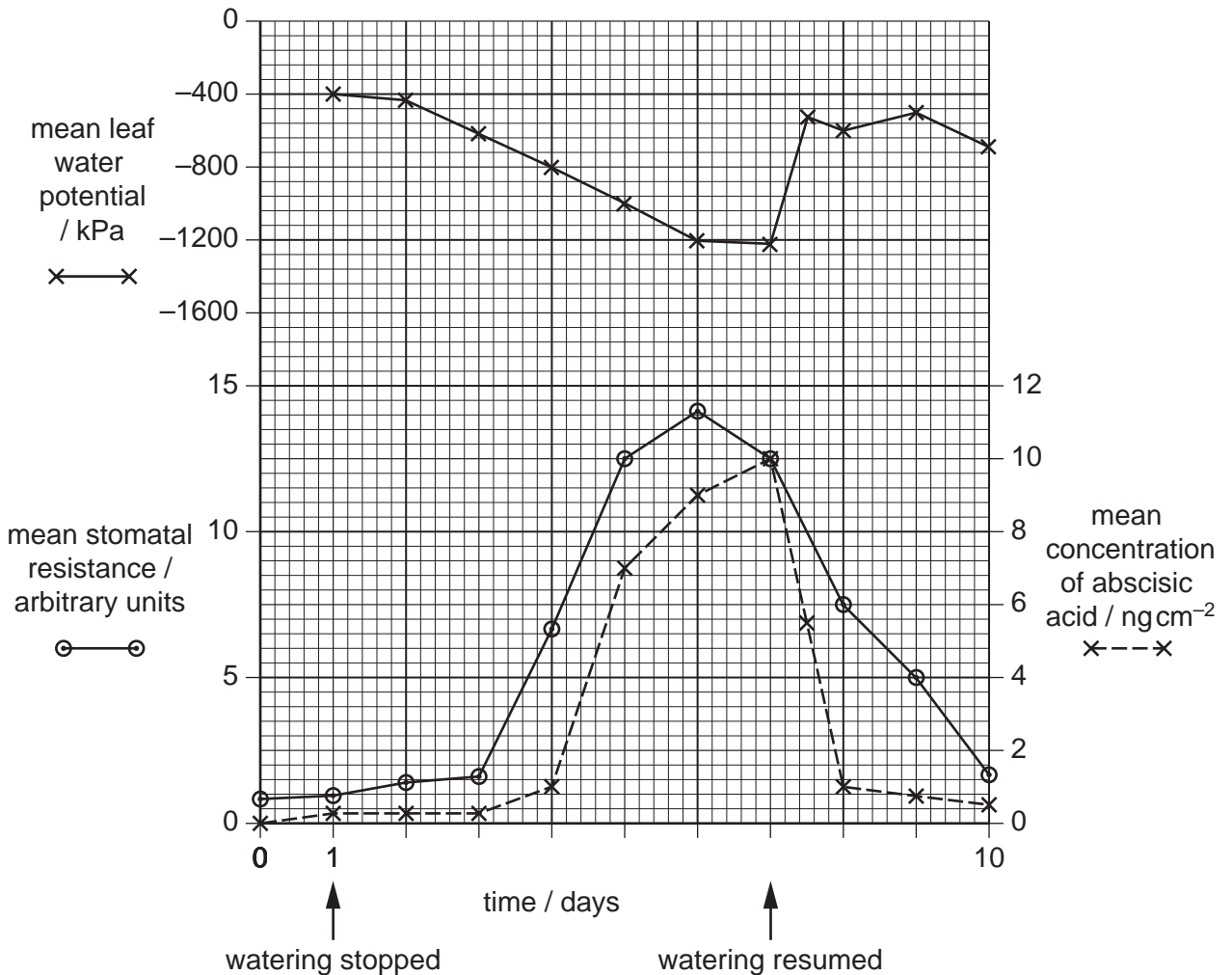


Fig. 3.1

With reference to Fig. 3.1,

- (i) describe **and** explain the changes in abscisic acid concentration over the 10 day period

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..... [3]

- (ii) explain the changes in stomatal resistance over this period.

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..... [2]

- (c) Explain how the changes you have described in (b) help sorghum to survive in arid conditions.

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..... [2]

[Total: 9]

- 3 A student investigated growth in the roots of broad bean, *Vicia faba*. The student cut sections of the root tip of this plant and viewed them with a light microscope.

Fig. 1.1 is a photomicrograph of one of the sections. The cell labelled **D** is in interphase.

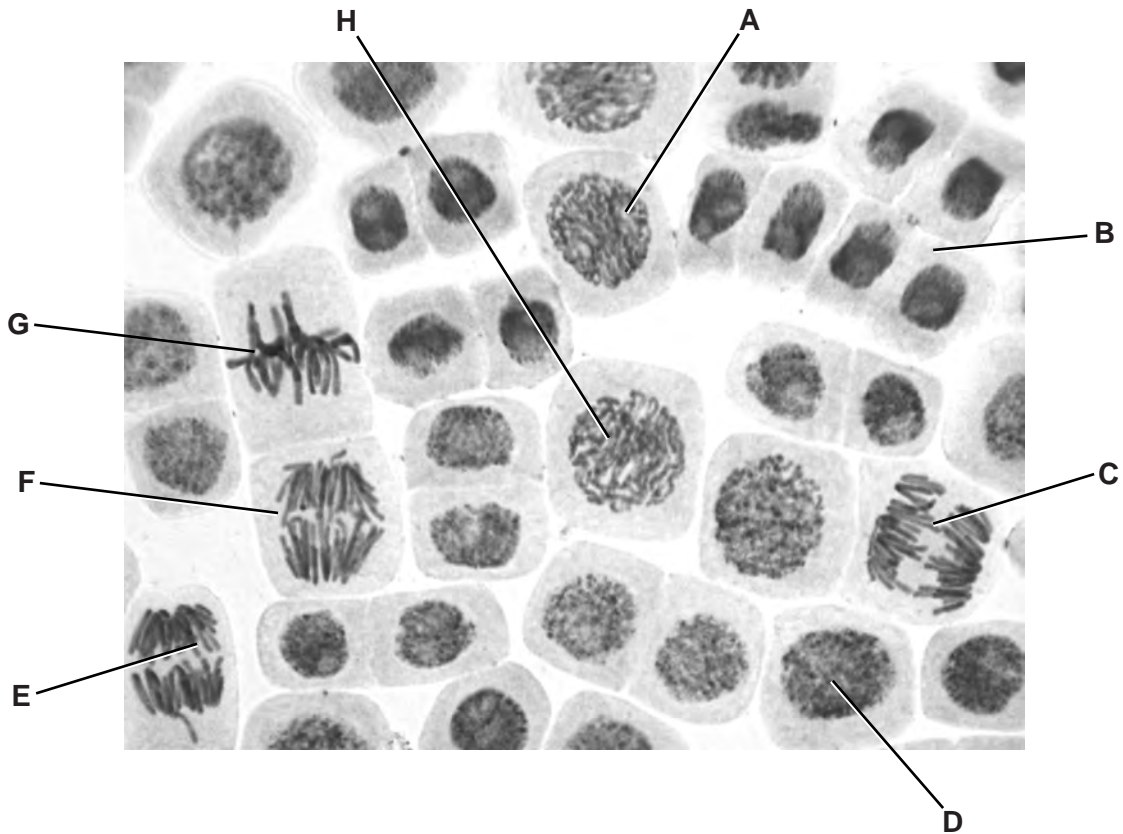


Fig. 1.1

(a) Complete the table below by:

- naming the stages of mitosis in the correct sequence following interphase
- identifying **one** example from the cells labelled **A** to **H** that is in each stage of mitosis that you have named.

stage of mitosis	label from Fig. 1.1

(d) *V. faba* is a legume. Roots of legumes often have swellings at intervals known as nodules. Cells within the nodules contain nitrogen-fixing bacteria.

(i) Explain the role of nitrogen fixation in the nitrogen cycle.

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.....[2]

(ii) Farmers in some parts of the world grow legume crops together with cereal crops in the same field. This is known as intercropping.

Explain how intercropping results in an increase in the yield of the cereals when the legumes die.

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.....[3]

[Total: 14]

- 4 (a) Fig. 1.1 shows a section through part of a dicotyledonous leaf of the tea plant *Camellia sinensis*.

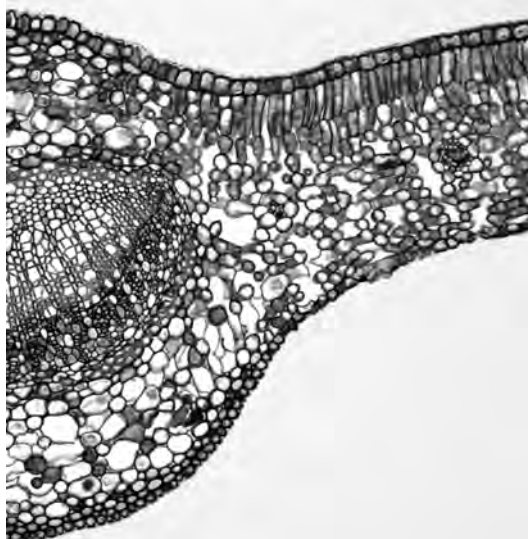


Fig. 1.1

On Fig. 1.1, use label lines and letters to label each of the following parts:

X – xylem tissue

P – palisade mesophyll tissue.

[2]

- (b) The leaves of *C. sinensis* have a large surface area and are thin.

Explain how each of these two features help the leaf to carry out photosynthesis.

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..... [2]

- (c) The lower epidermis contains stomata.

(i) State **one** structural difference between a guard cell and other lower epidermal cells.

..... [1]

- (ii) Abscisic acid has an important role in the closure of a stoma. It promotes the loss of potassium ions from guard cells.

Outline how the loss of potassium ions from guard cells will lead to the closure of a stoma.

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..... [3]

[Total: 8]

- 5 The Indian cobra (*Naja naja*) is a species of venomous snake found in South Asia.

Fig. 6.1 shows an Indian cobra.



Fig. 6.1

- (a) The Indian cobra's venom contains a toxin which causes muscle paralysis in mammals bitten by the snake. The toxin acts at cholinergic synapses.

Suggest ways by which the toxin in cobra venom may cause muscle paralysis.

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(b) Describe the role played by calcium ions in synaptic transmission.

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(c) Synapses slow down the rate of transmission of nerve impulses but have an important role in the nervous system.

Outline **two** of the roles of synapses in the nervous system.

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[Total: 8]