

Photosynthesis as an energy transfer process

Question Paper 7

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Photosynthesis
Sub Topic	Photosynthesis as an energy transfer process
Booklet	Theory
Paper Type	Question Paper 7

Time Allowed : 74 minutes

Score : / 61

Percentage : /100

Grade Boundaries:

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

Save My Exams! – The Home of Revision

For more awesome GCSE and A level resources, visit us at www.savemyexams.co.uk/

A series of horizontal dotted lines for writing.

Save My Exams! – The Home of Revision

For more awesome GCSE and A level resources, visit us at www.savemyexams.co.uk/

A series of horizontal dotted lines for writing.

- 3 (a) In flowering plants, the light-dependent reactions are carried out by photosynthetic pigments which fall into two categories: primary pigments and accessory pigments.

Outline the role played by accessory pigments in the light-dependent reactions.

.....

.....

.....

..... [2]

- (b) Photosynthetic pigments are arranged in photosystems. There are two photosystems, PSI and PSII. PSI takes part in cyclic photophosphorylation but PSII does not.

Outline the differences between cyclic and non-cyclic photophosphorylation.

.....

.....

.....

.....

.....

.....

.....

..... [4]

- (c) The rate of photosynthesis is affected by several environmental factors. Fig. 8.1 shows the effect of temperature on the rate of photosynthesis.

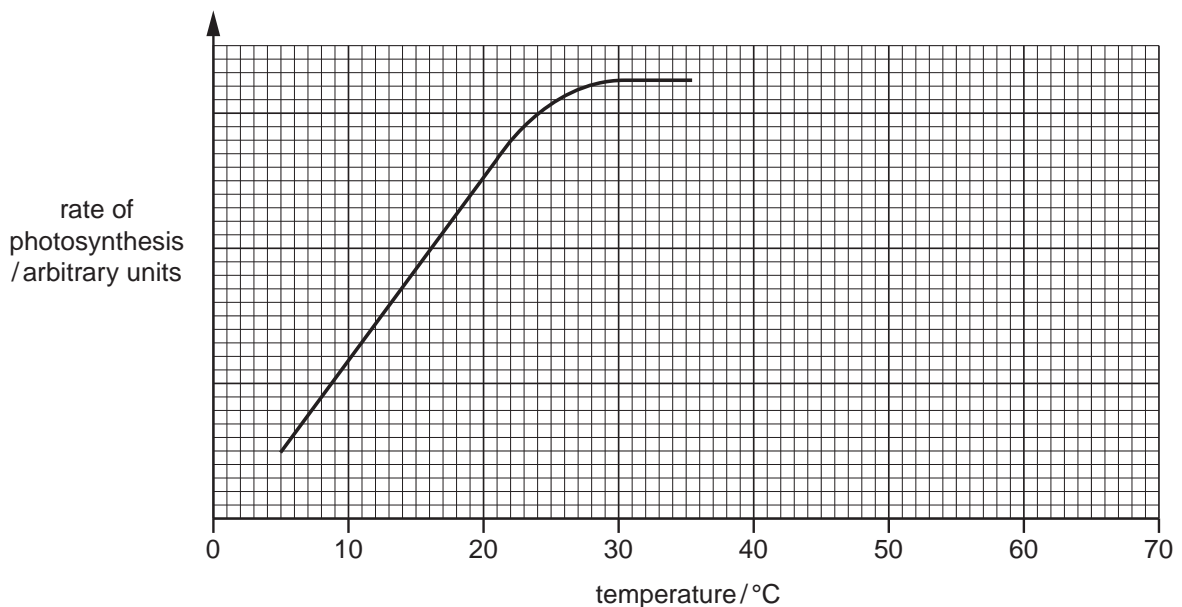


Fig. 8.1

(i) Explain why the rate of photosynthesis levels out at 30°C.

.....

 [2]

(ii) On Fig. 8.1 continue the curve to indicate what would happen to the rate of photosynthesis if the temperature was increased to 70°C. [1]

(iii) Explain why you have continued the curve in this way.

.....

 [2]

(d) A palisade mesophyll cell is adapted to carry out photosynthesis. The table below lists some of the adaptations of a palisade mesophyll cell.

Complete the table to show how these adaptations help the cell to carry out photosynthesis.

adaptation	how the adaptation helps photosynthesis
thin cell wall
cylindrical shape
large vacuole
chloroplasts can be moved within the cell

[4]

[Total: 15]

- 4 Maize, *Zea mays*, is a cereal crop that is adapted for growth at high temperatures. However, it does not cope with drought as well as some other crops, such as sorghum.

An investigation was carried out into the effect of low water availability on the activity of mitochondria taken from maize seedlings.

Young seedlings were uprooted and left in dry air for varying periods of time to reduce the water potential of their tissues.

- (a) Explain why this treatment reduced the water potential of the maize seedling tissues.

.....

.....

.....

..... [2]

- (b) After drying in air, mitochondria were extracted from the tissues of the seedlings. The extracted mitochondria were provided with succinate, which is one of the intermediate compounds in the Krebs cycle, and also with ADP and inorganic phosphate. The rate at which the extracted mitochondria took up oxygen was measured. The results are shown in Fig. 4.1.

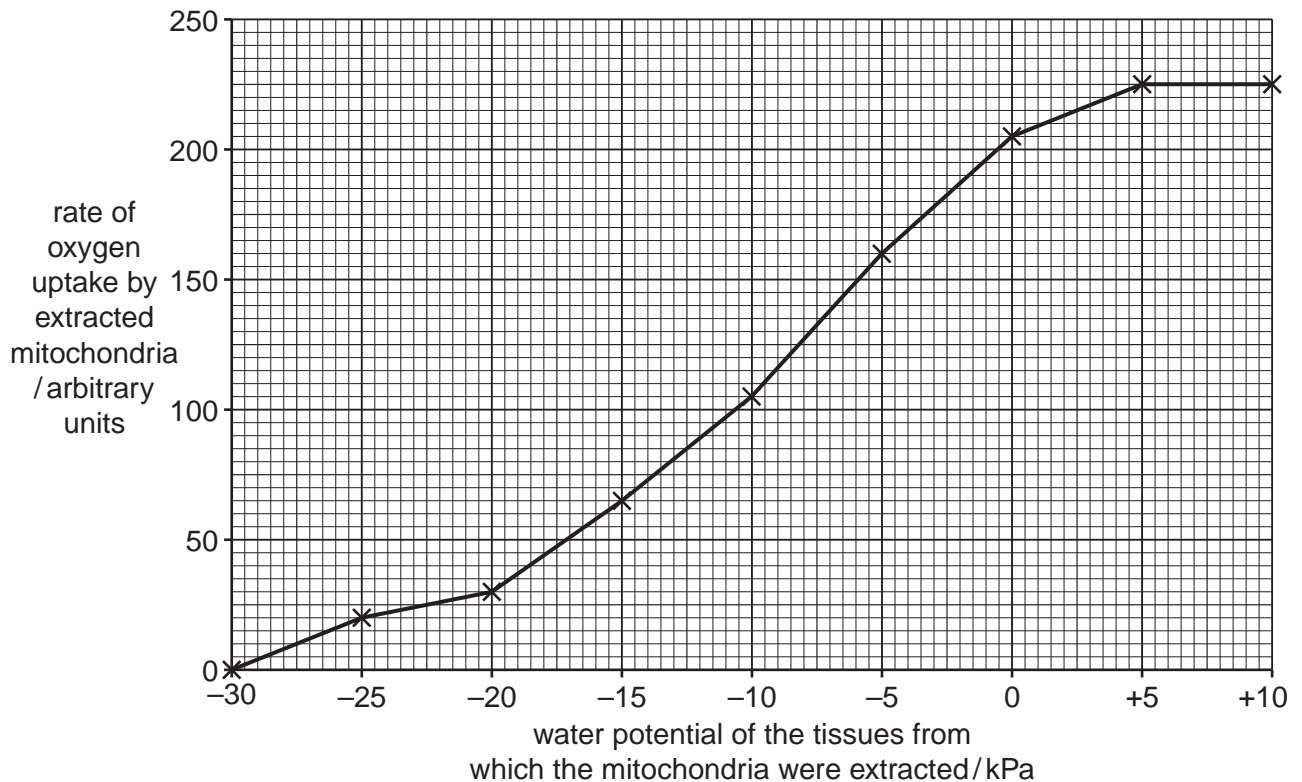


Fig. 4.1

(i) Describe the results shown in Fig. 4.1.

.....
.....
.....
..... [2]

(ii) The mitochondria take up oxygen. Explain how this oxygen, plus the succinate, ADP and inorganic phosphate, are used by the mitochondria.

.....
.....
.....
.....
.....
.....
.....
.....
..... [4]

(c) In a further experiment, it was found that mitochondrial membranes lost their normal structure when the water potential was low.

(i) Suggest why membranes in cells lose their normal structure when the water potential is low.

.....
.....
.....
.....
..... [3]

(ii) Suggest how this could explain the results shown in Fig. 4.1.

.....
.....
.....
.....
.....
..... [3]

(d) In tissues where water potential is low, the mitochondria of sorghum are affected in a very similar way to those of maize.

Describe **two** ways in which sorghum plants are adapted to prevent the development of low water potentials in their tissues during drought conditions.

1.
.....
2.
..... [2]

[Total: 16]