Centre Number	Candidate Number	Name

CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Level

BIOLOGY **9700/04**

Paper 4 Structured Questions A2 Core

May/June 2003

1 hour

Candidates answer on the Question Paper.
No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces provided at the top of this page.
Write in dark blue or black pen in the spaces provided on the Question Paper.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
The number of marks is given in brackets [ ] at the end of each question or part question.

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

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TOTAL	

This document consists of **9** printed pages and **3** blank pages.

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Answer **all** the questions.

Write your answers in the spaces provided.

1 Fig. 1.1 is a diagram of a palisade cell from a dicotyledonous leaf.

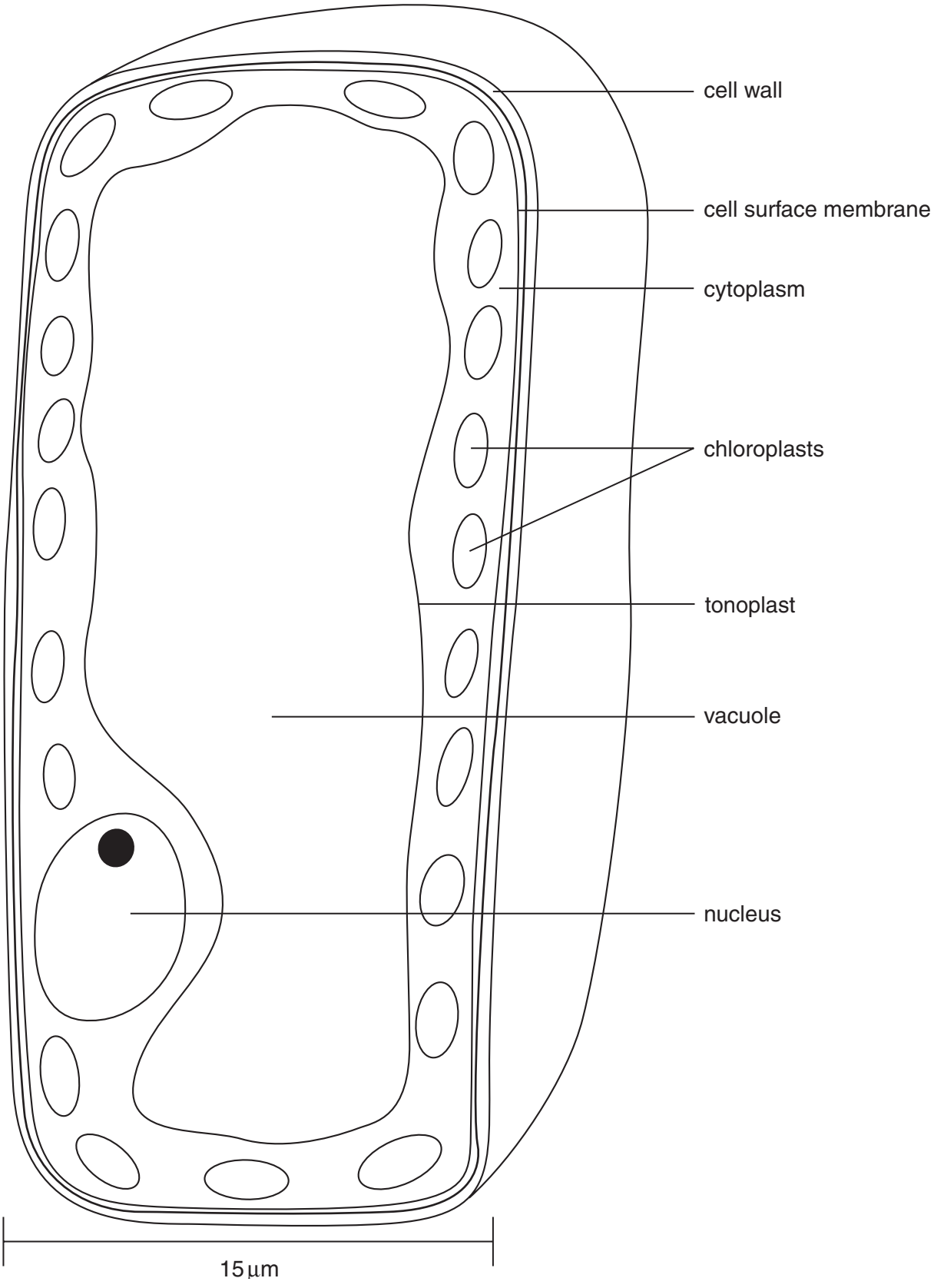


Fig. 1.1

(a) Describe how these cells are arranged in the leaf.

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.....[2]

(b) With reference to Fig. 1.1, explain how the structure of this cell is related to its function in photosynthesis.

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.....[3]

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Fig. 1.2 is a diagram of an electron micrograph of part of a chloroplast showing thylakoid membranes.

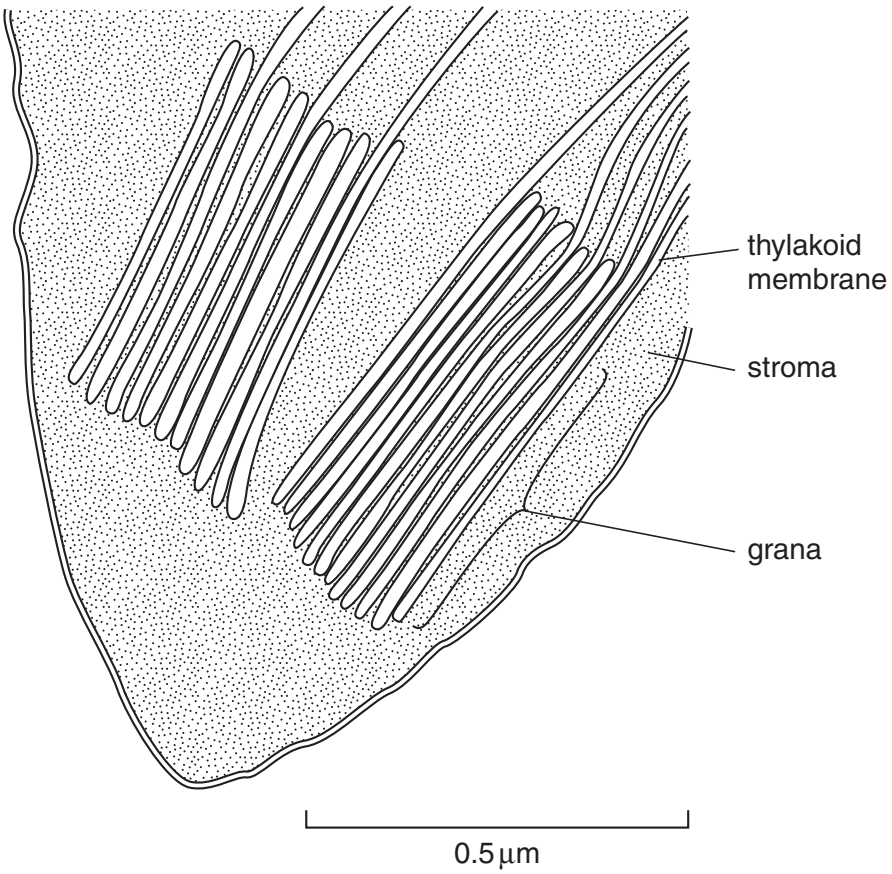


Fig. 1.2

(c) Describe the role of the thylakoid membrane in photosynthesis.

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.....[4]

(d) Describe how carbon dioxide is fixed in the stroma.

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.....[2]

[Total : 11]

For Examiner's Use

2 **(a)** Describe the importance of ATP in cells, giving **two** examples of processes in which it is used.

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.....[3]

Cells generate ATP by adding a phosphate group (P_i) to ADP.
During the complete oxidation of glucose, cells have two ways of doing this:

- substrate level phosphorylation
- oxidative phosphorylation

Figs 2.1 and 2.2 are diagrams that show the main details of these two processes (not drawn to the same scale).

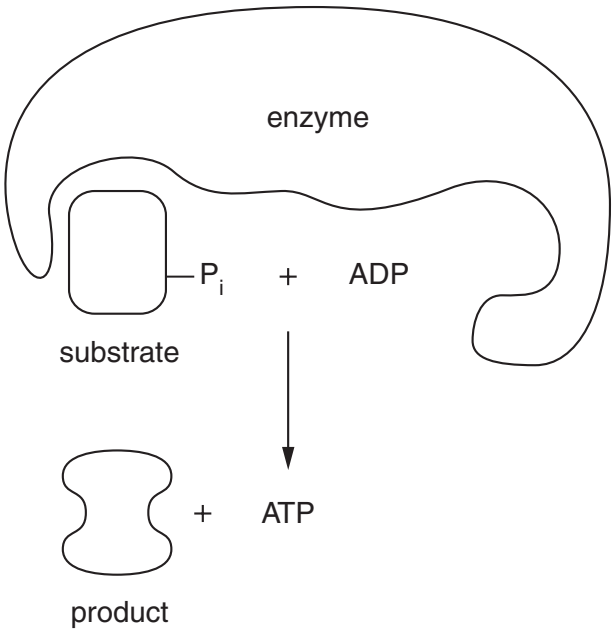


Fig. 2.1

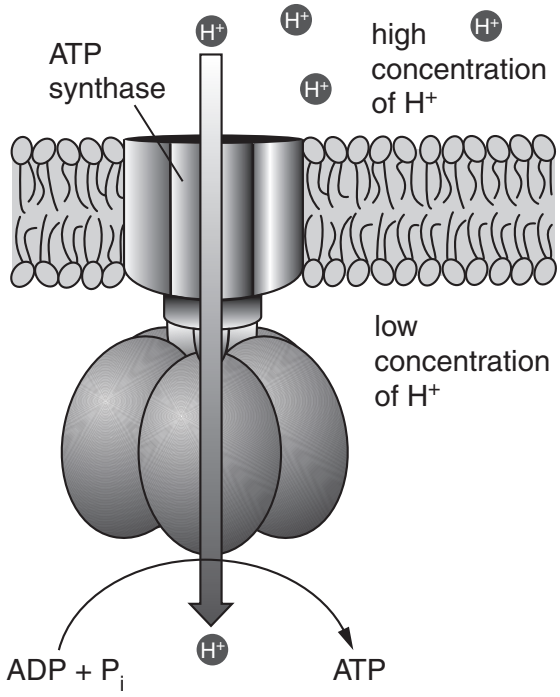


Fig. 2.2

(b) State precisely where these two processes occur in a cell.

substrate level phosphorylation

.....

.....

oxidative phosphorylation

.....

.....
[2]

[Turn over

(c) Compare the relative amounts of ATP produced by the two processes when a molecule of glucose is completely oxidised.

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.....[2]

(d) Only substrate level phosphorylation is possible in the absence of oxygen.
Explain why oxidative phosphorylation is **not** possible in the absence of oxygen.

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.....[3]

[Total : 10]

3 Fig. 3.1 is a diagram that shows the events that occur between two neurones at a synapse.

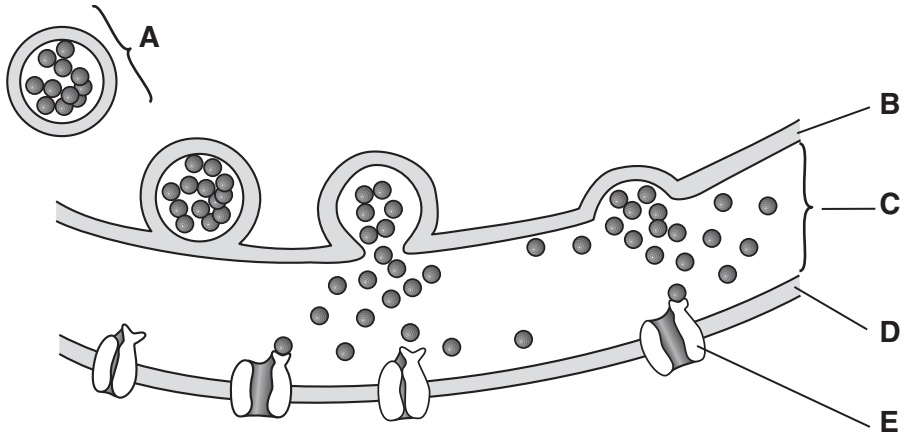


Fig. 3.1

(a) Name **A** to **E**.

A .....

B .....

C .....

D .....

E .....

[5]

(b) Draw a large arrow on the diagram to indicate the direction of the impulse across the synapse. [1]

(c) Describe the role of calcium ions in synaptic transmission.

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[Total : 9]

4 Fig. 4.1 is a diagram drawn from a photomicrograph of an animal cell undergoing meiosis.

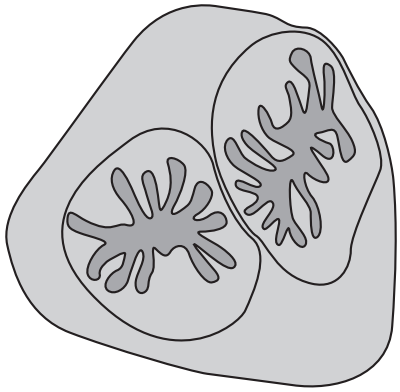


Fig. 4.1

(a) Identify the stage of meiosis shown in Fig. 4.1.

.....[2]

(b) Describe the main events that will occur to complete meiosis from this stage.

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(c) Describe **two** ways in which meiosis leads to variation.

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[4]

[Total : 10]

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5 **(a)** Distinguish between phenotype and genotype.

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(b) Describe how artificial selection differs from natural selection.

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(c) Define the terms

(i) *gene;*

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.....[2]

(ii) *allele.*

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.....[3]

[Total : 10]

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