

Cambridge  
International  
AS & A Level

**Cambridge International Examinations**  
Cambridge International Advanced Subsidiary and Advanced Level

CANDIDATE  
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**BIOLOGY**

**9700/21**

Paper 2 Structured Questions AS

**May/June 2016**

**1 hour 15 minutes**

Candidates answer on the Question Paper.

No Additional Materials are required.

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

**DO NOT WRITE IN ANY BARCODES.**

Answer **all** questions.

Electronic calculators may be used.

You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.

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

This document consists of **13** printed pages and **3** blank pages.

Answer **all** the questions.

- 1 Table 1.1 shows features of three infectious diseases: malaria, tuberculosis (TB) and cholera. Complete Table 1.1.

**Table 1.1**

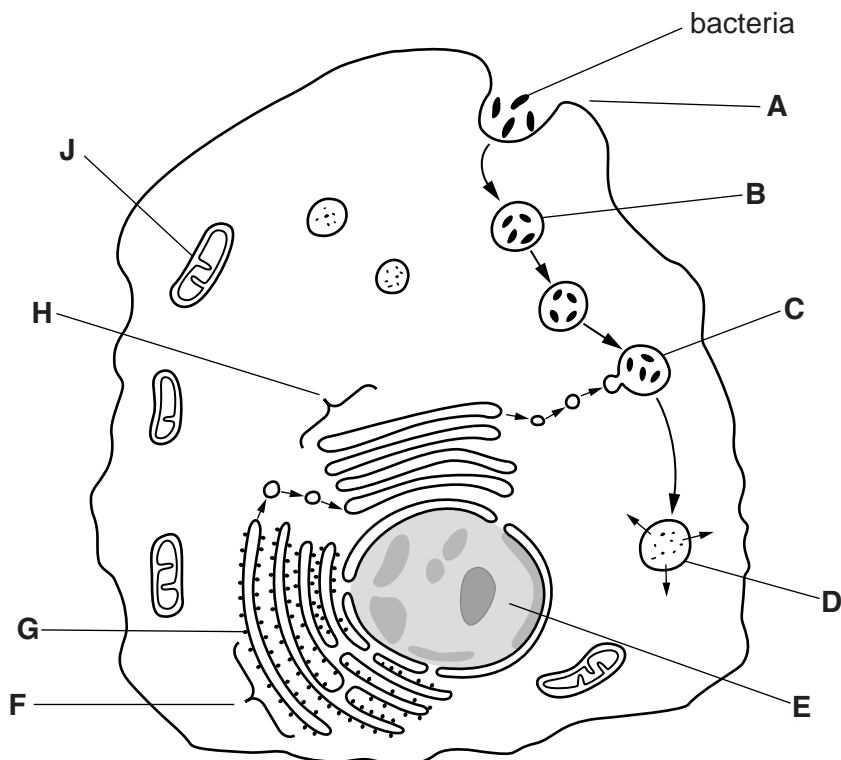
feature	malaria	tuberculosis	cholera
name of pathogen	..... <i>falciparum</i>	<i>Mycobacterium tuberculosis</i>	..... .....
type of organism	.....	bacterium	.....
method of transmission	..... ..... .....	..... ..... .....	drinking water and food contaminated with human faeces

[6]

[Total: 6]

- 2 Macrophages synthesise intracellular enzymes.

Fig. 2.1 is a summary diagram of events that occur in a macrophage.



**Fig. 2.1**

(a) (i) Name the process at **A**.

.....[1]

(ii) Name the stages of protein synthesis that occur at **E** and at **F**.

**E** .....

**F** .....[2]

(iii) Name organelles **B**, **G**, **H** and **J**.

**B** .....

**G** .....

**H** .....

**J** .....[4]

(b) Describe what happens to the bacteria between **C** and **D**.

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



3 A student studied a transverse section of the trachea of a small mammal. The student drew a plan diagram of the section as shown in Fig. 3.1.

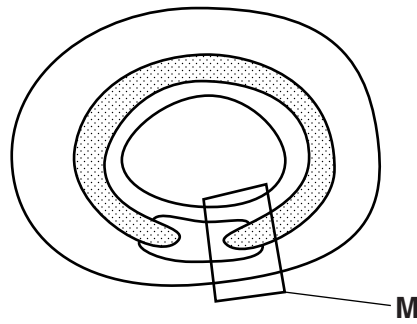


Fig. 3.1

Fig. 3.2 is a photomicrograph of the area labelled M in Fig. 3.1.



Fig. 3.2

(a) Name:

(i) the type of epithelium at N

.....[1]

(ii) the structures at O

.....[1]

(iii) the tissue at P.

.....[1]



4 (a) Transpiration is often described as ‘an inevitable consequence of gas exchange in leaves’.

Explain what is meant by this description.

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

(b) Explain how hydrogen bonding is involved in the movement of water in the xylem.

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

Southern beech trees of the genus *Nothofagus* grow in forests in the South Island of New Zealand. Fig. 4.1 shows a small part of a forest.

Most of the trees in the forests form a thick canopy of leaves. These are known as canopy trees. The tallest trees are known as emergent trees. Some trees do not reach the canopy and are known as suppressed trees.

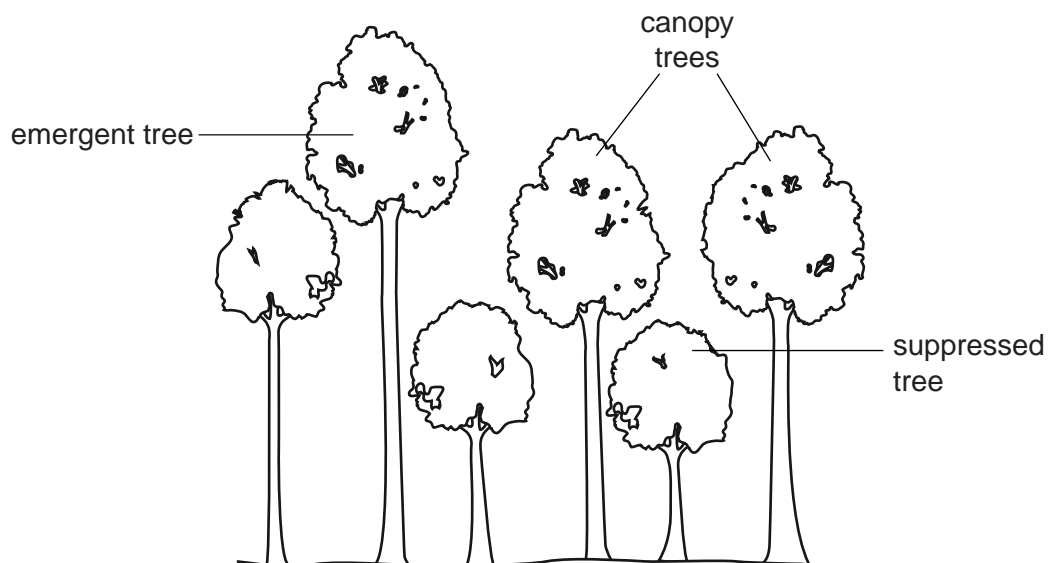
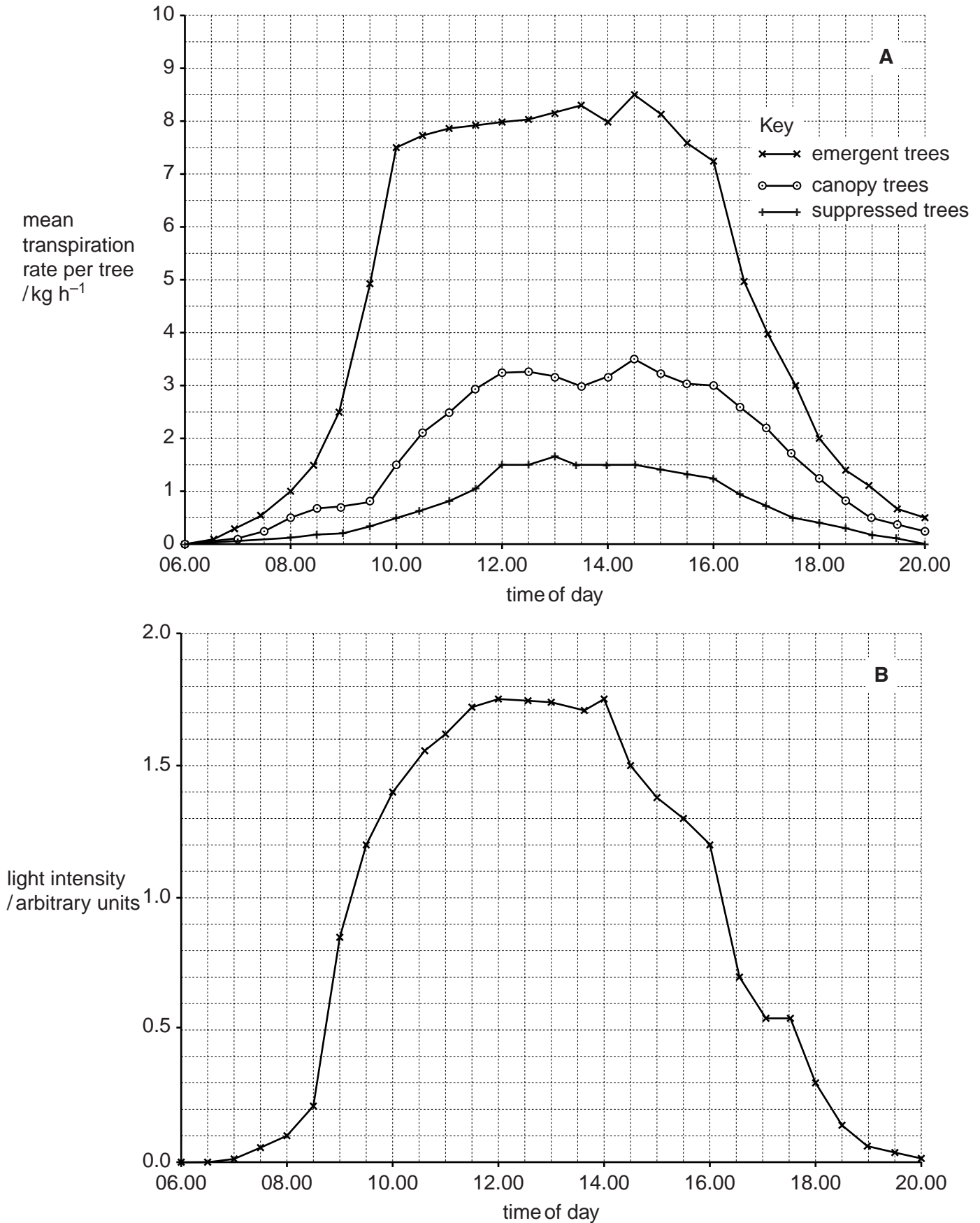


Fig. 4.1

Researchers determined the rates of transpiration of emergent, canopy and suppressed trees in a forest over a 14 hour period from 06.00 until 20.00 on one day in the summer. The results are shown in Fig. 4.2A. They also recorded changes in light intensity above the canopy over the same time period as shown in Fig. 4.2B.



**Fig. 4.2**











- 6 Fig. 6.1 shows an incomplete diagram of the fluid mosaic model of membrane structure. The diagram shows the cell surface membrane of a eukaryotic cell.

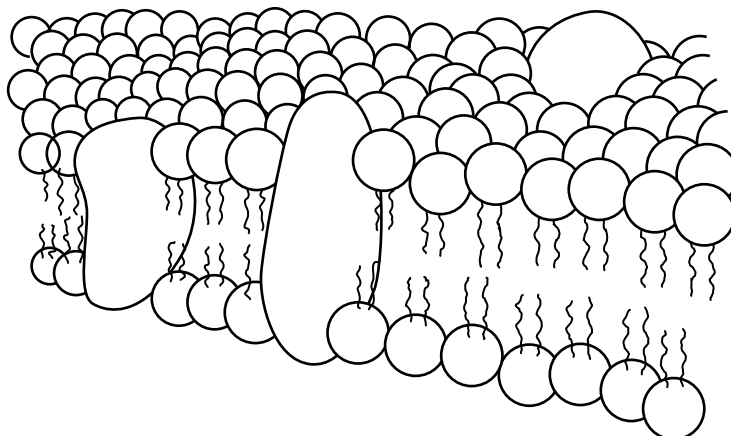


Fig. 6.1

- (a) State what is meant by the term fluid mosaic.

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

- (b) State the thickness of a cell surface membrane.

.....[1]

- (c) List four features of cell surface membranes of eukaryotic cells that are **not** visible in Fig. 6.1.

1 .....  
.....  
2 .....  
.....  
3 .....  
.....  
4 .....  
.....[4]

[Total: 7]





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