UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2926908010

BIOLOGY **9700/23**

Paper 2 Structured Questions AS **October/November 2010**

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 in the spaces provided at the top of this page.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
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.

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1	
2	
3	
4	
5	
6	
Total	

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

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1 Fig. 1.1 shows a diagram of part of a cell surface membrane.

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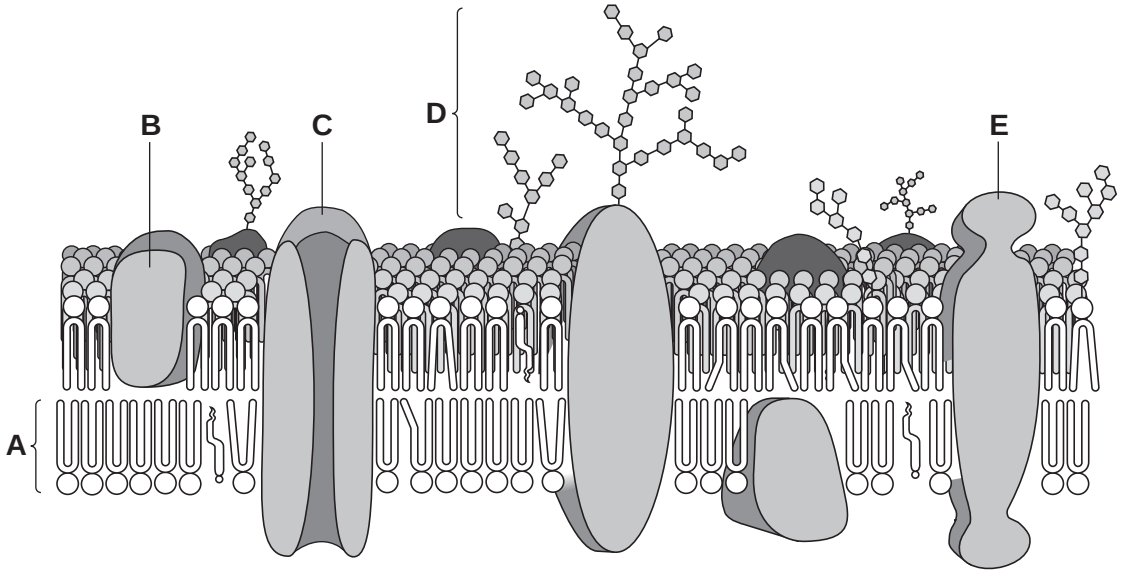


Fig. 1.1

(a) (i) Name molecules **A** and **B**.

A .....

B .....[2]

(ii) Explain how the features of molecules of **A** cause them to form a layer in the membrane as seen in Fig. 1.1.

.....

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.....

.....

.....[3]

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(b) State the functions of **C** and **D**.

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C .....

.....

D .....

.....[2]

(c) Structure **E** is a protein composed of 588 amino acids.

Calculate the minimum number of nucleotide base pairs required in the gene coding for this protein. Show your working.

Answer = ...[2]

[Total: 9]

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[Turn over

2 Fig. 2.1 shows a world map shaded by country according to the incidence of tuberculosis (TB).

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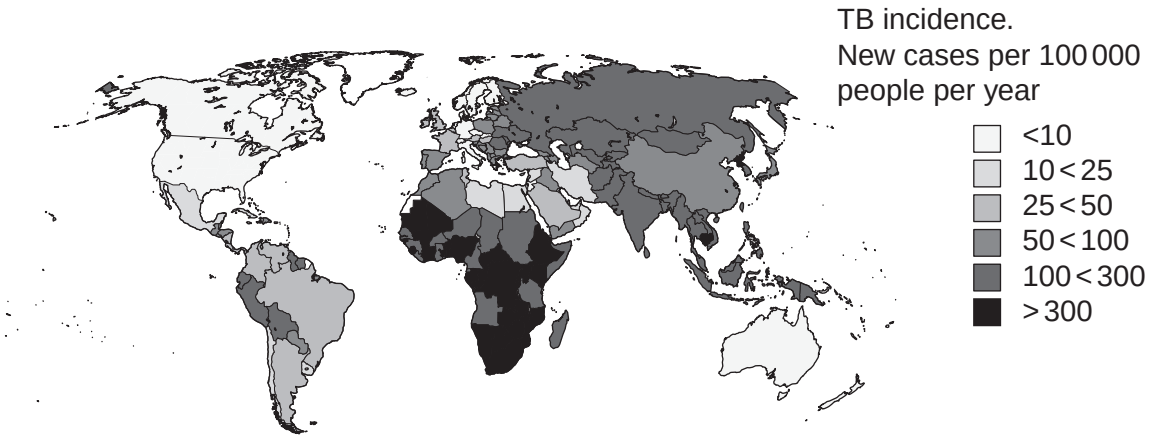


Fig. 2.1

(a) State the name of the pathogenic organism which causes TB and describe its mode of transmission from infected to uninfected people.

name of organism .....

mode of transmission .....

.....

.....[3]

(b) People suffering from TB are treated using antibiotics. Recently, multi-drug resistant TB (MDR-TB) has developed, making the disease more difficult to treat.
Suggest how this drug resistance may have arisen.

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.....[2]

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(c) The World Health Organization (WHO) aims to eradicate TB worldwide by 2050. With reference to Fig. 2.1, discuss the problems to be faced in the eradication of TB.

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[Total: 10]

3 The enzyme sucrase is used by many organisms for the hydrolysis of sucrose. Fig. 3.1 shows a diagram of the enzyme and its substrate.

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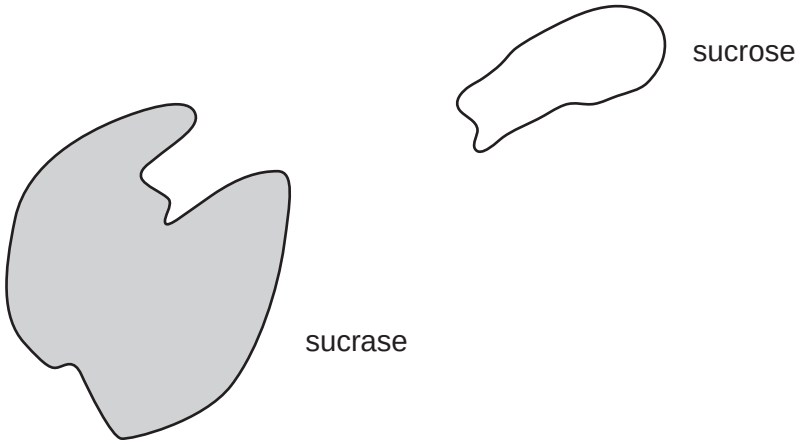


Fig. 3.1

(a) (i) State the names of the products of the hydrolysis of sucrose.

.....[1]

(ii) With reference to Fig. 3.1, describe the mechanism of action of the enzyme in converting the substrate to products.

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.....[4]

(iii) Copper ions (Cu^{2+}) will inhibit the enzyme sucrase.
Suggest which type of inhibition occurs.

.....[1]

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(b) Sucrose is one of the assimilates transported in the phloem sieve tubes of plants from source to sink. Sucrase is found in sinks.

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(i) Suggest the role played by sucrase in the process of unloading of sucrose at sinks.

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.....[2]

(ii) Plant sink organs convert excess products of sucrose hydrolysis to storage molecules, such as starch.

Explain why these products of hydrolysis themselves cannot be stored in plant tissue.

.....

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.....[3]

[Total: 11]

4 **(a)** Outline the roles of the T-lymphocytes and B-lymphocytes in a primary immune response.

For Examiner's Use

T-lymphocytes .....

.....

.....

.....

B-lymphocytes .....

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.....[4]

Fig. 4.1 shows how the concentration of antibody in blood plasma changes during the response to an antigen which is injected at day 0.

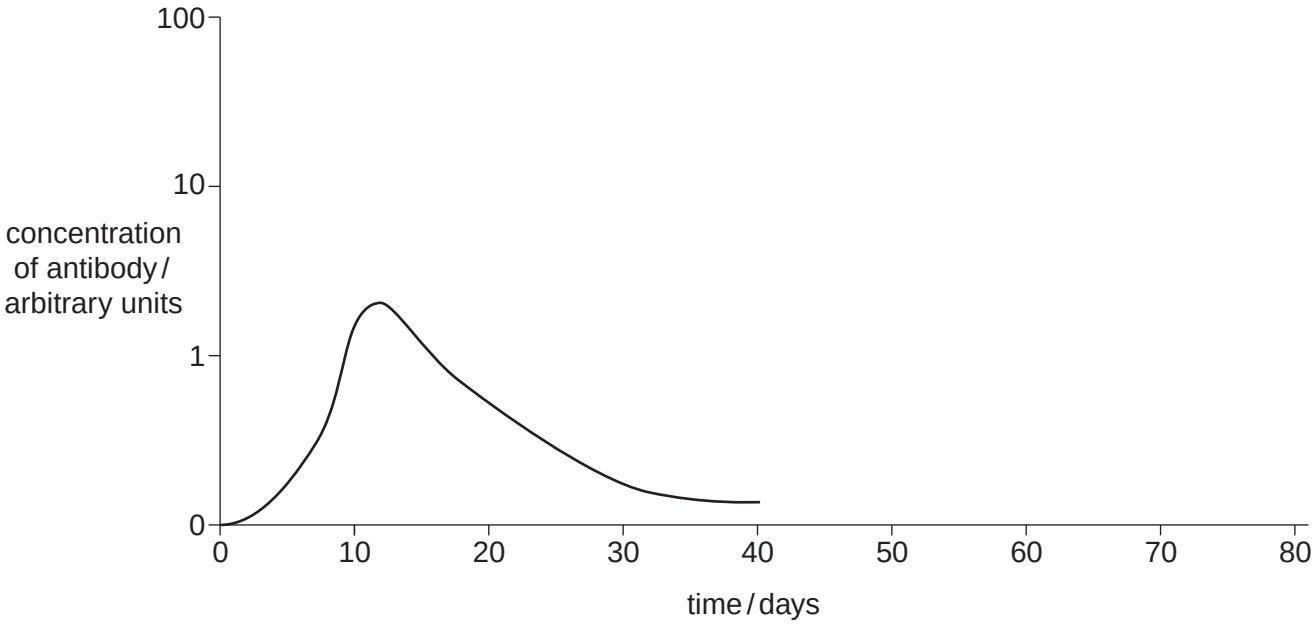


Fig. 4.1

(b) Explain why the concentration of antibody falls as shown in Fig. 4.1.

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.....[3]

(c) Draw on Fig. 4.1 how the antibody concentration would change if the **same** antigen entered the blood plasma on day 40. [3]

[Total: 10]

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5 **(a)** Describe and explain how the structure of alveoli is adapted for efficient gas exchange.

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.....[3]

Fig. 5.1 shows a cross-section of normal human alveoli and Fig. 5.2 shows a cross-section of alveoli from a person suffering from emphysema.

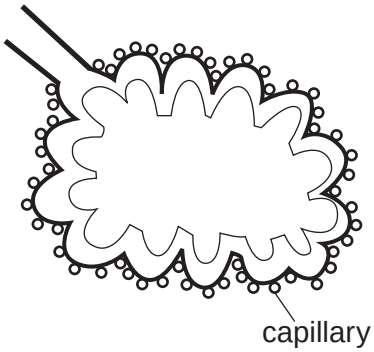


Fig. 5.1

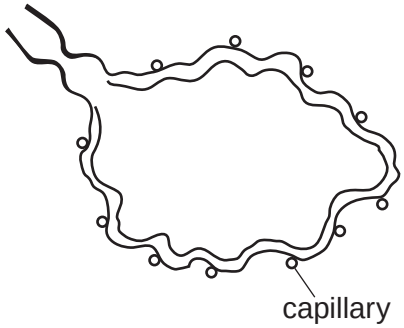


Fig. 5.2

(b) **(i)** State the most common cause of emphysema.

.....[1]

(ii) With reference to changes visible in Fig. 5.1 and Fig. 5.2, state and explain the effect of emphysema on the alveoli and on gas exchange.

.....

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.....

.....[2]

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(c) State three symptoms of emphysema.

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1. .....

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2. .....

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3. .....

.....[3]

[Total: 9]

6 Fig. 6.1 shows the directions of **nutrient flow** in a soil food web.

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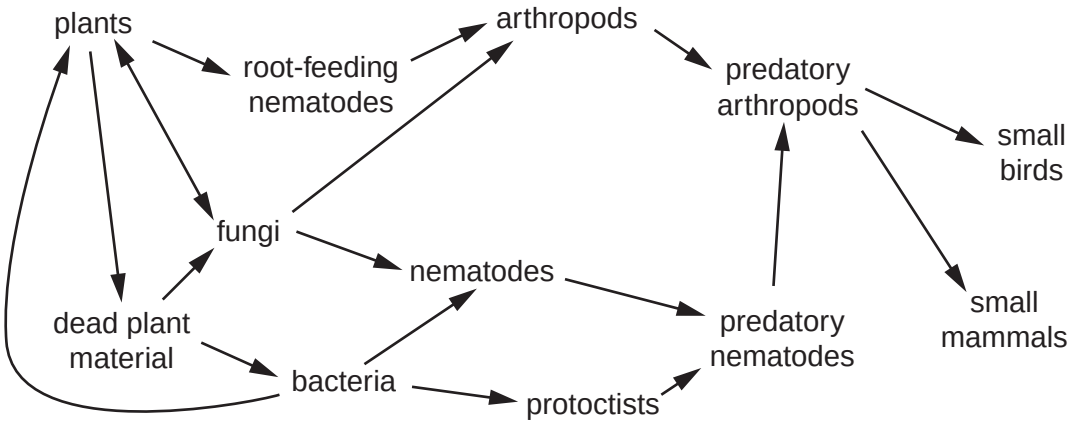


Fig. 6.1

(a) (i) Magnesium is an example of a nutrient required by organisms.
State **one** role of magnesium in organisms.

.....[1]

(ii) State, in terms of **nutrient flow**, the significance of the double-headed arrow between plants and fungi.

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.....[2]

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(b) The small birds shown in Fig. 6.1 are preyed upon by larger birds.

(i) State which trophic level these larger birds occupy.

.....[1]

(ii) Some large animals feed on more than one trophic level.
Suggest why this is so.

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.....[2]

(c) Communities of organisms, in soil habitats, have been described by biologists as "the driving force for the environment".

(i) Define the terms

community .....

.....

habitat .....

.....[2]

(ii) Suggest what is meant by the term "driving force for the environment".

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.....[3]

[Total: 11]

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