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Centre Number	Candidate Number	Name

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

BIOLOGY **9700/02**

Paper 2 Structured Questions AS

October/November 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.

FOR EXAMINER'S USE	
1	
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5	
6	
TOTAL	

This document consists of **11** printed pages and **1** blank page.

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UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

[Turn over

Answer **all** the questions.

Write your answers in the spaces provided.

1 Fig. 1.1 is a photomicrograph of a transverse section of an artery and a vein from a mammal.



Fig. 1.1

(a) State three ways, **visible in Fig. 1.1**, in which the artery differs from the vein.

1 .....

.....

2 .....

.....

3 .....

.....[3]

(b) The lungs contain arteries, veins and capillaries.

Explain the role of capillaries in the lungs.

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.....[3]

(c) Describe the effect of tar from cigarettes on the lining of the gaseous exchange system.

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.....[3]

[Total: 9]

2 Fig. 2.1 shows the flow of energy through an ecosystem.

All the figures are in kJ m^{-2} $year^{-1}$.

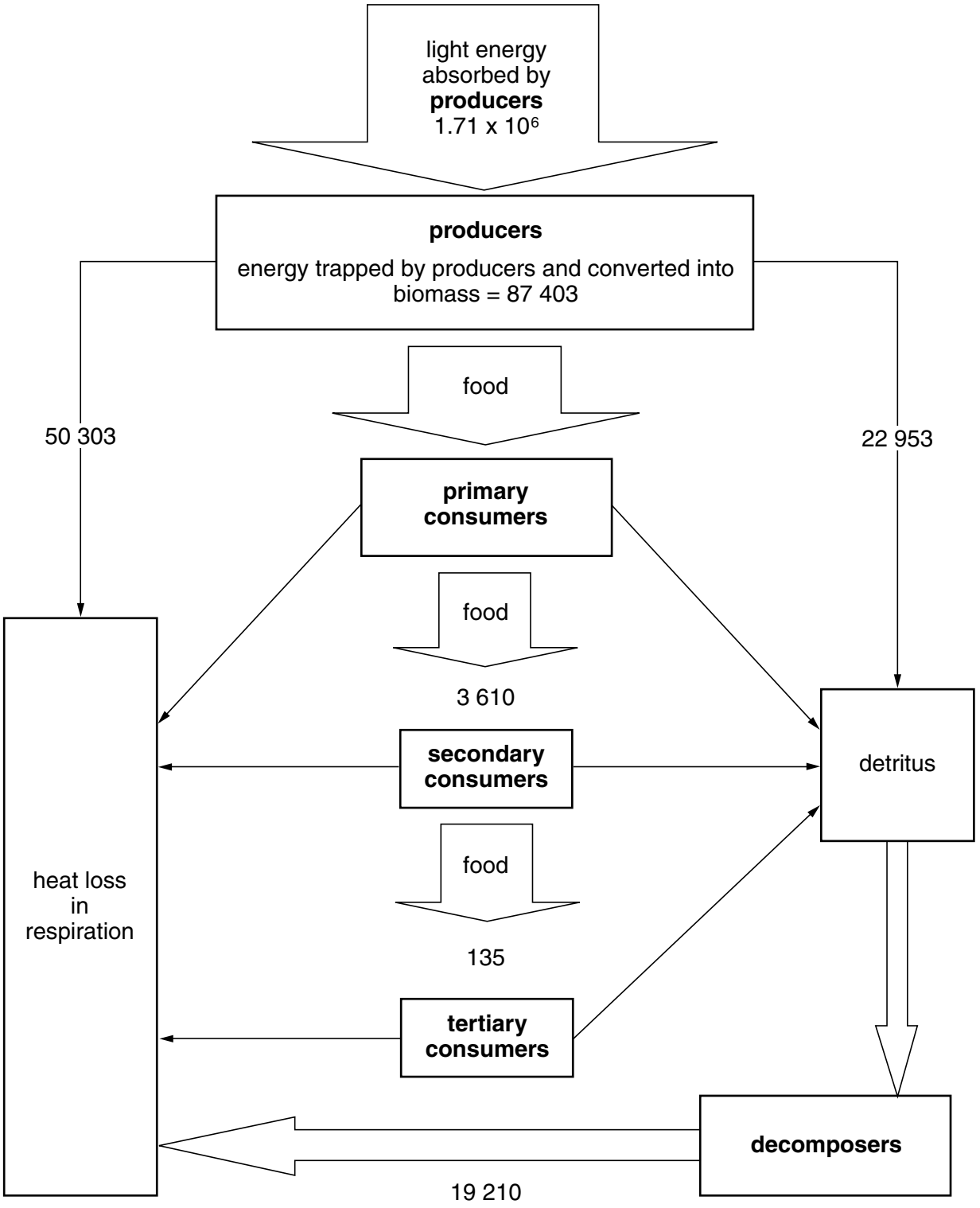


Fig. 2.1

For Examiner's Use

(a) Calculate how much energy is available to the primary consumers in this ecosystem.

.....[1]

(b) The efficiency of energy transfer between trophic levels is calculated by comparing the energy available to a trophic level with the energy available to the next trophic level. Between secondary and tertiary consumers, this is calculated as follows.

$$\frac{\text{energy available to tertiary consumers}}{\text{energy available to secondary consumers}} \times 100\ \%$$

Use the formula above to calculate the efficiency of energy transfer between the secondary consumers and the tertiary consumers in this ecosystem.

.....

.....

.....[1]

(c) In some food webs, individual consumer species feed at different trophic levels.

With reference to Fig. 2.1, explain an advantage of this for these consumer species.

.....

.....

.....[2]

(d) Explain the role of decomposers in the cycling of carbon and nitrogen in ecosystems.

.....

.....

.....

.....

.....

.....[4]

[Total: 8]

[Turn over

3 Complete the following passage on cholera.

Cholera is an acute intestinal infection caused by the bacterium ..... . It has a short incubation period, from less than one day to five days, and produces a toxin that causes symptoms, such as ..... that can quickly lead to severe dehydration and death if not treated promptly. Cholera bacteria are transmitted by contaminated ..... . In highly endemic areas, it is mainly a disease of young children, although breastfeeding infants are rarely affected. Limited stocks of two oral cholera vaccines that provide high-level protection for several months against one strain of cholera have recently become available in a few countries. The vaccine stimulates an .... , involving the lymphocytes in the lining of the gut. The B lymphocytes produce ..... that act against the cholera bacteria, which tend to remain in the intestines during an infection.

[Total: 5]

4 Starch, glycogen and cellulose are all polysaccharides. They are made from monomers that are joined by covalent bonds.

(a) Complete the table below to show which of the statements apply to each of the polysaccharides.

Fill in each box using a tick (✓) to show that the statement applies and a cross (✗) if it does not.

statement	starch	glycogen	cellulose
glycosidic bonds between monomers			
monomer is β glucose			
stored within chloroplasts			
stored in muscle cells			
exists in two forms – branched and unbranched chains			

[5]

A solution of the enzyme amylase was added to a solution of starch and kept at 25 °C. The starch was broken down by hydrolysis.

(b) Explain how you would determine the rate of hydrolysis.

.....

.....

.....

.....

.....

.....[4]

[Total: 9]

For Examiner's Use

5 **(a)** State the roles of glycoproteins, carrier proteins and cholesterol in the cell surface membrane of an animal cell.

glycoproteins .....

.....

.....

carrier proteins .....

.....

.....

cholesterol .....

.....

.....[4]

(b) Fig. 5.1 is a diagram of an animal cell showing the concentrations and direction of movement of an ion **(A)** and a non-polar molecule **(B)** on either side of the cell surface membrane.

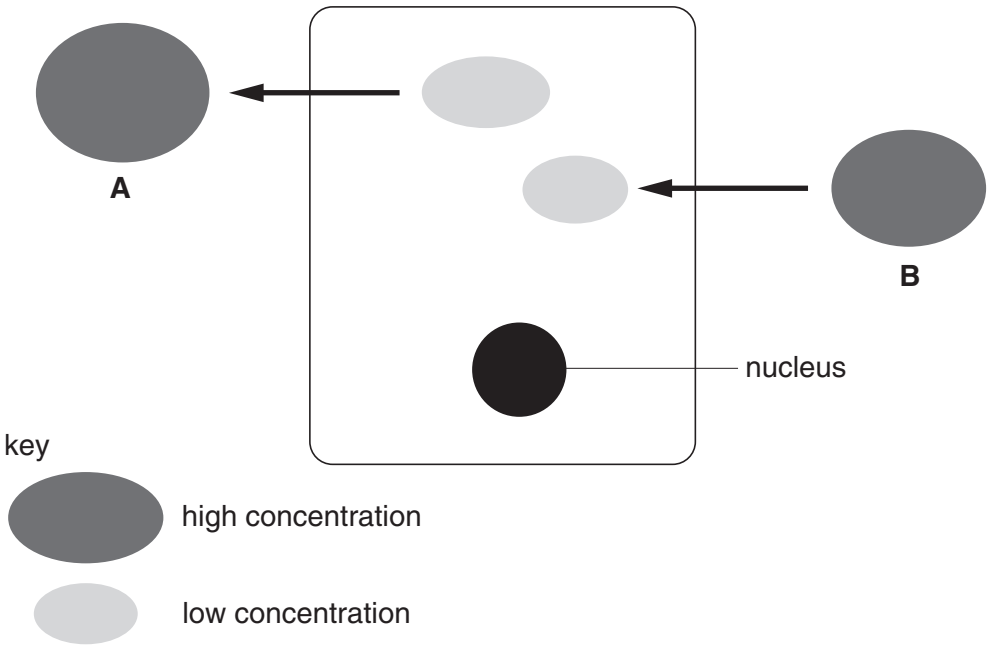


Fig. 5.1

With reference to Fig. 5.1, explain how **A** and **B** cross the cell surface membrane of the cell.

A .....

.....

.....

B .....

.....

.....[4]

(c) Describe how particles, such as bacteria, are taken up by phagocytes.

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.....[2]

(d) Phagocytes contain many lysosomes.

State the function of lysosomes in phagocytes.

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.....[1]

[Total: 11]

6 An athlete exercised for eight minutes. The athlete's oxygen consumption was measured before, during and after the exercise. The results are shown in Fig. 6.1.

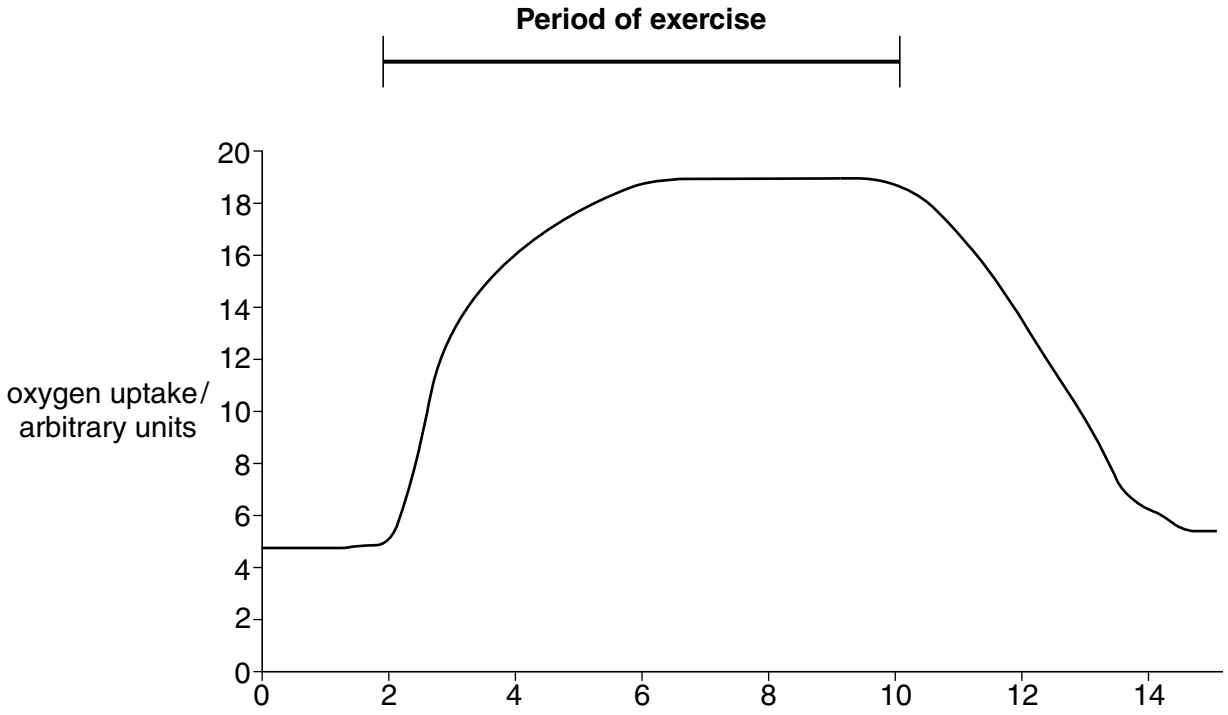


Fig. 6.1

(a) Explain why the athlete's oxygen consumption increased between two minutes and six minutes.

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.....[2]

(b) Explain why the athlete's oxygen consumption took more than four minutes to decrease to resting values after the end of exercise.

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.....[4]

(c) Heart transplants and coronary by-pass surgery are used in the treatment of heart disease.

State two reasons why heart transplants are much less common than coronary by-pass surgery in the treatment of heart disease.

1 .....

.....

2 .....

.....[2]

[Total: 8]

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