OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced Subsidiary GCE

BIOLOGY 2801

Biology Foundation

Monday **27 MAY 2002** Morning 1 hour

Candidates answer on the question paper.
Additional materials:
Electronic calculator

Candidate Name	Centre Number	Candidate Number

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers, in blue or black ink, in the spaces on the question paper.
- Read each question carefully before starting your answer.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is 60.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	8	
2	8	
3	6	
4	10	
5	5	
6	17	
7	6	
TOTAL	60	

This question paper consists of 14 printed pages and 2 blank pages.

Registered Charity Number: 1066969
[Turn over

Answer **all** the questions.

1 **(a)** Explain what is meant by the term *tissue*.

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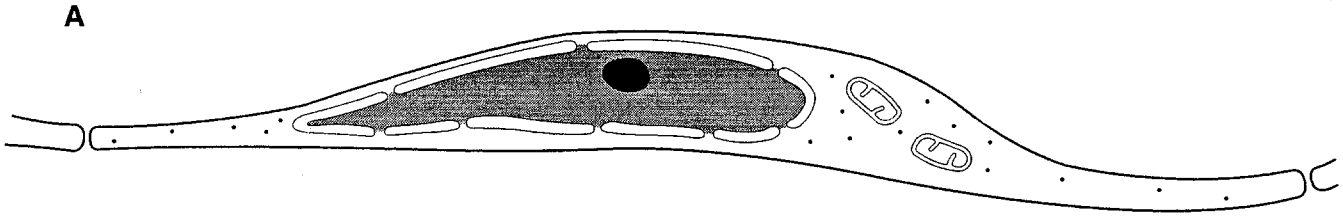
.....[2]

Fig. 1.1 shows a diagram of cells from two types of epithelial tissue, **A** and **B**, as seen under the electron microscope. The cells are not drawn to the same scale.

A



B

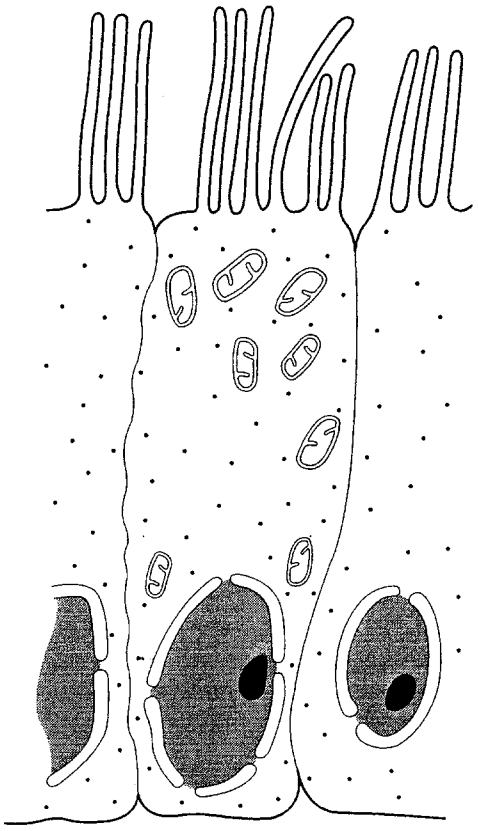


Fig. 1.1

(b) (i) Name the types of epithelial tissue **A** and **B**.

A .....

B .....[2]

(ii) Explain why the cells of tissue **B** contain many more mitochondria than those in tissue **A**.

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.....

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.....[2]

(c) State **two** ways in which cells of tissues **A** and **B** differ from prokaryotic cells.

1. .....

2. .....[2]

[Total : 8]

2 Food packaging often includes information on the nutritional value of the food product. The information on the side of a cereal packet indicates that the cereal contains iron, which 'Helps the body's use of oxygen, carrying it to all the cells of the body.'

(a) (i) Name the iron-containing molecule in the human body that transports oxygen.

.....[1]

(ii) Outline briefly how this molecule carries out the function stated for iron on the side of the cereal packet.

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.....[2]

The information on the cereal packet indicates that the cereal contains fat (triglyceride).

(b) Describe the molecular structure of a triglyceride.

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.....[3]

Cereals may also contain sodium, calcium, potassium, magnesium, chloride and phosphate ions.

(c) Complete the table below by choosing **two** of these ions and stating a function for each in living organisms.

ion	function

[2]

[Total : 8]

[Turn over

3 The glucose molecule has two different ring structures, α-glucose and β-glucose.

(a) (i) Describe the difference in structure between these two forms of glucose.

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.....[2]

(ii) Explain how two glucose molecules are joined to form a disaccharide.
(You may use annotated diagrams if you wish.)

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[3]

Cellulose is a polymer of β-glucose. It is an important component of plant cell walls.

(b) State a property of cellulose that makes it suitable for this function.

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.....[1]

[Total : 6]

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Turn to page 8 for Question 4.

4 Fig. 4.1 represents the transfer of energy through a woodland ecosystem.

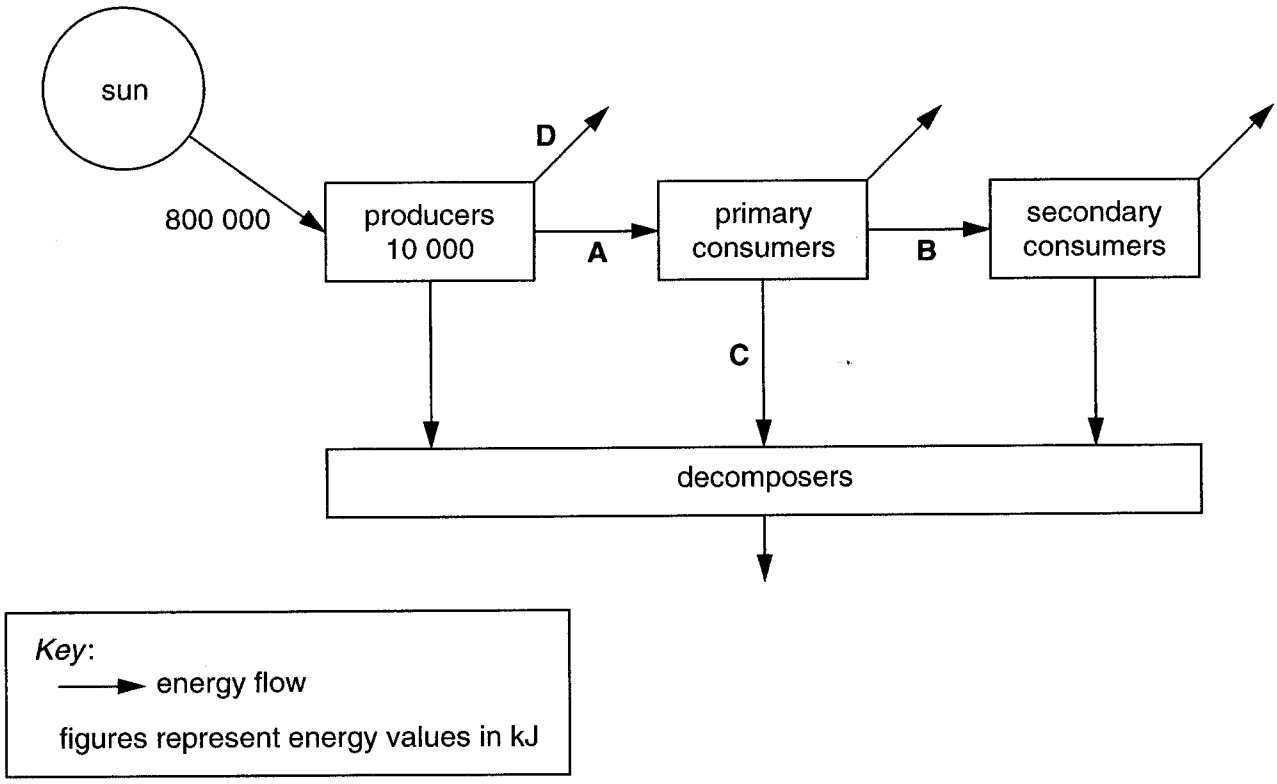

Fig. 4.1

Of the 800 000 kJ of energy which strikes the producers, only 10 000 kJ of energy is converted by the producers in photosynthesis.

(a) (i) Calculate the percentage of energy striking the producers that is converted in photosynthesis.

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.....[2]

(ii) Explain what happens to the energy **striking the producers** that is not converted in photosynthesis.

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.....[2]

(b) (i) State the approximate percentage energy transfer between the producers and primary consumers at **A**.

.....[1]

(ii) State **two** ways in which energy is transferred from primary consumers to decomposers at **C**.

1. .....

2. .....[2]

(iii) State how energy is lost from the producers at **D**.

.....[1]

(iv) Suggest why the percentage energy transfer between producers and primary consumers at **A** is less than that between the primary consumers and secondary consumers at **B**.

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.....[2]

[Total : 10]

5 Maize grains contain an enzyme which can convert starch to maltose (a reducing sugar). 20 maize grains were soaked in water for 48 hours, after which 10 of the grains were killed by boiling. Extracts were prepared from both the living maize grains, extract **P**, and the dead maize grains, extract **Q**.

Extract **P** was added to an equal volume of starch solution in a test tube and maintained at 30 °C. Samples were taken at 30 second intervals and tested with iodine solution.
Extract **Q** was treated in exactly the same way.
The results are shown in Table 5.1.

Table 5.1

maize grain extract	time taken for blue-black colour to disappear/min
P (from living grains)	3.5
Q (from dead grains)	did not disappear

(a) Explain why

(i) the blue-black colour did not disappear with the extract from dead maize grains;

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.....[2]

(ii) the extract from dead maize grains was included in the investigation.

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.....[1]

(b) Explain why an enzyme which catalyses the conversion of starch to maltose is unable to catalyse the conversion of a protein into amino acids.

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.....[2]

[Total : 5]

6 One of the uses of genetic engineering is in the synthesis of human insulin. Before this technology had been perfected, insulin was obtained from animals, such as pigs.

(a) Describe how

(i) the isolated human insulin gene is inserted into a bacterial plasmid;

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.....[4]

(ii) the bacteria which take up the modified plasmids can be identified.

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.....[2]

(b) Suggest why it is considered preferable to use genetically engineered sources of human insulin rather than insulin obtained from pigs.

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.....[1]

For Examiner's Use

(c) Describe the process of protein synthesis in cells.
In your answer, include the roles of messenger RNA, transfer RNA and ribosomes.
(In this question, 1 mark is available for quality of written communication.)

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.....[9]

QWC [1]

[Total : 17]

[Turn over for Q7

7 Mitosis occurs in some animal cells as they divide. During this type of division, changes occur to the nuclear envelope.

(a) State the stages of mitosis in which the nuclear envelope

disappears.....

reforms .....[2]

(b) Outline the roles of membranes **within** cells.

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.....[4]

[Total : 6]