Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

BIOLOGY **0610/03**

Paper 3 Extended

October/November 2005

1 hour 15 minutes

Candidates answer on the Question Paper.
There are no Additional Materials.

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 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.
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 questions.

FOR EXAMINER'S USE	
1	
2	
3	
4	
5	
6	
7	
TOTAL	

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

1 Toads are amphibians. Only two species are native to Britain, the Common toad (*Bufo bufo*) and the Natterjack toad (*Bufo calamita*).
Natterjack toads like warm sandy soil in open and sunny habitats, with shallow pools for breeding. Examples of these habitats are heathland and sand dunes.
Common toads like cooler, more shady habitats, such as woodland.
Many areas of sand dunes are being developed for camp sites. Heathland can easily change to woodland as trees grow on it. In the summer, woodland is colder than heathland due to the shade the trees create.
These conditions suit the Common toad, but not the Natterjack. As a result of the changing habitats the Natterjack toad is becoming an endangered species.

(a) (i) Name **one** external feature that identifies an animal as an amphibian.

..... [1]

(ii) Amphibians are a class of vertebrate.

Name two other vertebrate classes.

1. .....

2. ..... [2]

(b) State **one** piece of information from the passage to show that the Common toad and Natterjack toad are closely related species.

.....

..... [1]

(c) From the information provided, state two reasons why Natterjack toads are becoming endangered.

1. .....

.....

2. .....

..... [2]

(d) Suggest measures that could be taken to protect the Natterjack toad from extinction.

.....

.....

..... [2]

Fig. 1.1 shows a food web for British toads.

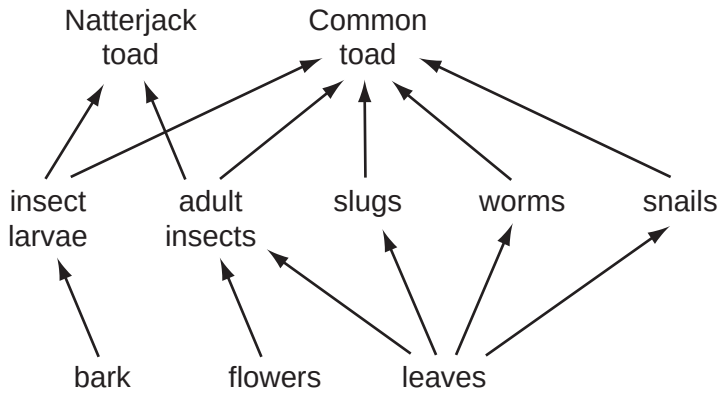

Fig. 1.1

(e) (i) State the trophic level of toads.

.....

[1]

(ii) State which foods the two species of toad both eat.

.....

[1]

(iii) With reference **only** to food, suggest why the Common toad is more likely to survive when the two species are in competition.

.....

.....

[1]

[Total: 11]

2 All the plants were removed in an area of ground next to a path. Four weeks later there were 113 groundsel plants growing there. The heights of the plants were measured, sorted into groups and recorded in Table 2.1.

Table 2.1

height / cm	frequency
0 - 3.9	8
4.0 - 7.9	28
8.0 - 11.9	27
12.0 - 15.9	21
16.0 - 19.9	9
20.0 - 23.9	9
24.0 - 27.9	5
28.0 - 31.9	4
32.0 - 35.9	1
36.0 - 39.9	1

The graph, Fig. 2.1, shows the spread of data but is incomplete.

(a) Complete the graph by adding the missing column **and** labelling the axes.

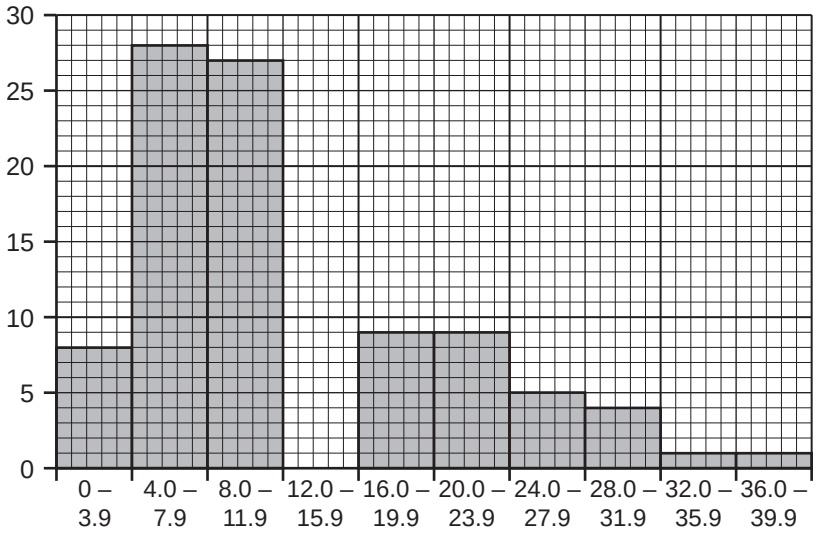

Fig. 2.1

[3]

(b) (i) State the type of variation shown by the graph.

..... [1]

(ii) The plants were all growing in the same soil and germinated at the same time.

Suggest three reasons why the plants were **not** all the same height.

1. .....

2. .....

3. ..... [3]

(c) Some of the plants had developed flowers that had features to attract insects.

(i) State two features a flower could have to attract insects.

1. .....

2. ..... [2]

(ii) State the role insects have when visiting these flowers.

..... [1]

(d) Some of the flowers developed seeds although insects had not visited them.

Suggest how seed formation could occur in the flowers **not** visited by insects.

.....

.....

..... [2]

[Total: 12]

3 Fig. 3.1 shows an external view of the heart and its blood vessels.

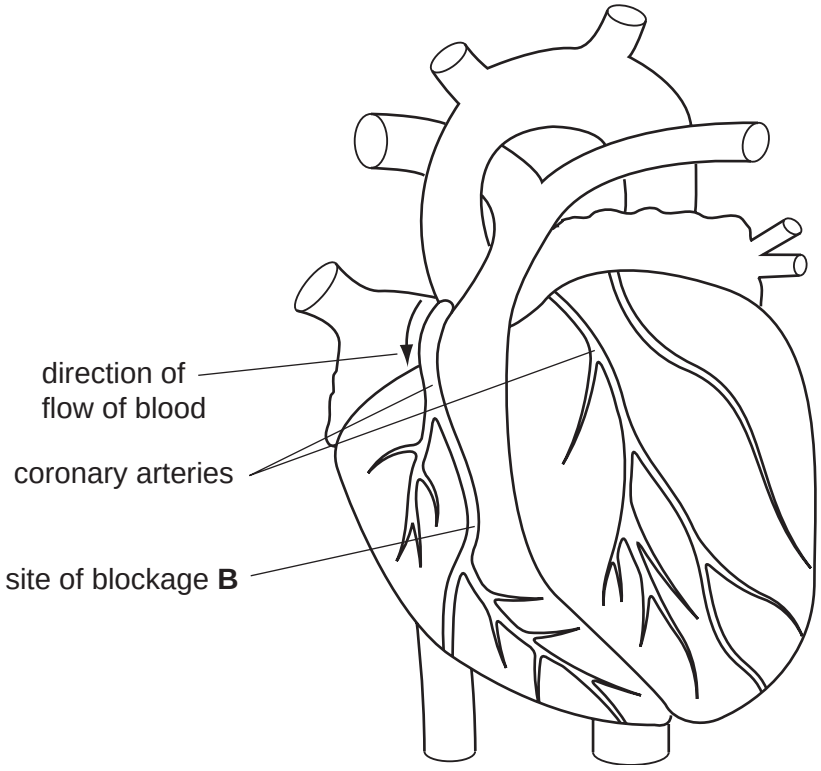

Fig. 3.1

(a) The coronary arteries supply heart tissue with useful substances. Coronary veins remove waste substances.

(i) Name two useful substances the coronary arteries will supply.

1. .....

2. ..... [2]

(ii) Name **one** waste substance the coronary veins will remove.

..... [1]

(b) The tissue forming the wall of the left ventricle responds when it is stimulated by electrical impulses.

(i) Name this type of tissue.

..... [1]

(ii) Describe how this tissue will respond when stimulated.

.....

..... [1]

(iii) Describe the effect of this response on the contents of the left ventricle.

.....

.....

..... [2]

(c) The coronary arteries can become blocked with a fatty deposit, leading to a heart attack.

(i) State two likely causes of this type of blockage.

1. .....

2. ..... [2]

(ii) A blockage occurs at point **B** in the coronary artery.

On Fig. 3.1, shade in the parts of the artery affected by this blockage. [1]

(d) Veins have different structures from arteries.

State two features of veins and explain how these features enable them to function efficiently.

1. Feature .....

.....

Explanation .....

.....

2. Feature .....

.....

Explanation .....

..... [4]

[Total: 14]

4 Jasmine went into a dark room from a bright corridor.

(a) Fig. 4.1 represents Jasmine's right eye before and after entering the dark room.

before entering

a few seconds **after** entering

Fig. 4.1

(i) Complete Fig. 4.1 by **drawing** the appearance of the pupil and iris

1. before entering the dark room, [1]

2. a few seconds after entering the dark room. [1]

(ii) Label the following parts of the eye on the first diagram in Fig. 4.1.

iris **pupil** **sclera** [3]

(b) Explain how the size of the pupil was changed when Jasmine went into the dark room.

.....

.....

..... [2]

(c) Explain why Jasmine could see shapes but **not** colours in the dark room.

.....

.....

.....

..... [3]

[Total: 10]

5 If the glucose in the blood rises above its normal concentration, insulin is secreted to bring the concentration back to normal.

(a) (i) Suggest one explanation for a rise in the concentration of glucose in the blood.

..... [1]

(ii) Name the organ that secretes insulin.

..... [1]

(iii) Describe the role of the liver in bringing the concentration of glucose in the blood back to normal.

.....

.....

..... [2]

(iv) State the term that describes how a substance, such as glucose, in the body is maintained at a constant level.

..... [1]

(b) Diabetics are unable to control their blood glucose levels naturally.

Human insulin can now be made using bacteria that have been genetically engineered.

(i) Insulin is a protein. Suggest why insulin has to be injected rather than taken by mouth.

.....

.....

..... [2]

(ii) Explain how bacteria can be genetically engineered and used to make human insulin.

.....

.....

.....

.....

..... [4]

[Total: 11]

6 **(a)** Define the term *enzyme*.

.....

..... [2]

(b) Enzymes are used in biological washing powders.

(i) Describe how the presence of these enzymes may increase the efficiency of the washing powder in removing stains from clothes.

.....

.....

.....

..... [3]

(ii) Explain why the temperature of the wash needs to be carefully controlled.

.....

.....

.....

..... [3]

(iii) Suggest a suitable temperature for a wash using a biological washing powder. Explain your answer.

Suitable temperature .....

Explanation .....

..... [1]

(c) Outline how enzymes can be manufactured for use in biological washing powders.

.....

.....

.....

.....

..... [4]

[Total: 13]

7 **(a)** Describe the effect sickle cell anaemia has on red blood cells.

.....

.....

..... [2]

(b) **(i)** The allele for normal haemoglobin production is $\mathbf{I^N}$. The allele for sickle cell haemoglobin production is $\mathbf{I^S}$. Two parents who are heterozygous have a child. With the help of a genetic diagram, predict the probability that this child would be heterozygous.

[4]

(ii) Explain why, under some circumstances, people who are heterozygous for this condition have a greater chance of survival than homozygous people.

.....

.....

.....

..... [3]

[Total: 9]

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