

First Variant Question Paper



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE
NAME

CENTRE
NUMBER

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CANDIDATE
NUMBER

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BIOLOGY

0610/31

Paper 3 Extended

May/June 2008

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 a pencil for any diagrams or graphs.

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.

For Examiner's Use

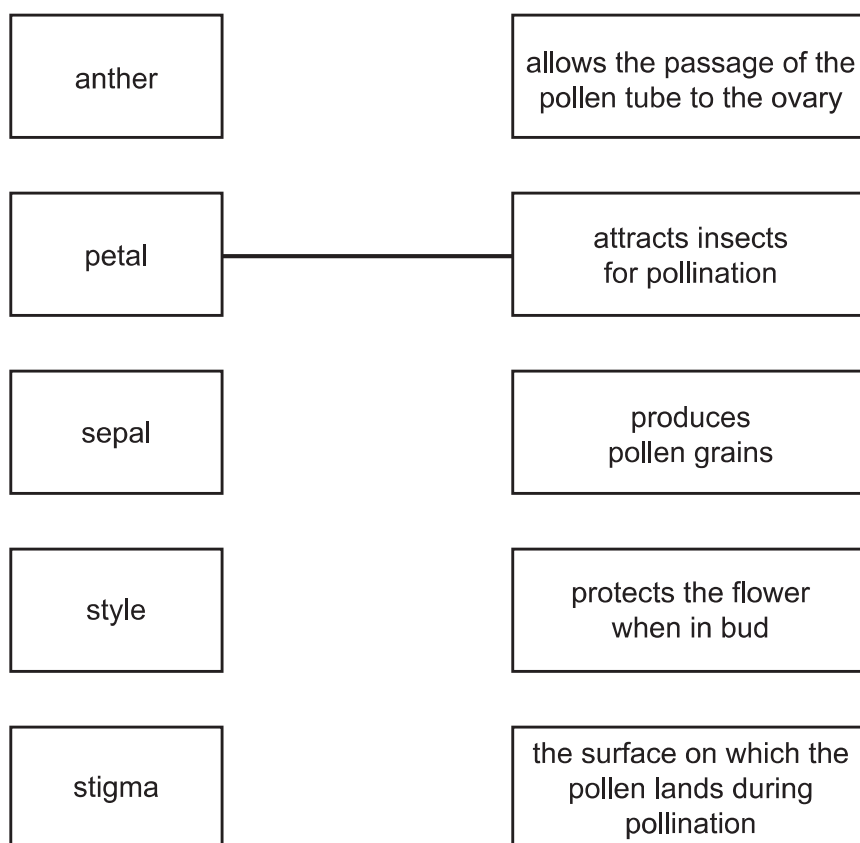
1	
2	
3	
4	
5	
Total	

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



- 1 (a) Using straight lines, match the names of the flower parts with their functions. One has been completed for you.

For
Examiner's
Use



[4]

- (b) Describe how the stigmas of wind-pollinated flowers differ from the stigmas of insect-pollinated flowers. Relate these differences to the use of wind as the pollinating agent.

.....

.....

.....

.....

..... [3]

- (c) Discuss the implications to a species of self-pollination.

.....

.....

.....

..... [3]

[Total: 10]

- 2 The wild dog is one of the smaller African carnivorous mammals. It has disappeared from 25 of the 39 countries where it used to live. Wild dogs hunt in packs, feeding on antelopes, which are grass-eating mammals.

A conservation programme has been started to increase the wild dog population in South Africa. Farmers are worried about numbers getting out of control because wild dogs breed at a very fast rate. However, conservationists are not concerned because the lion is a natural predator of the dogs.

- (a) Wild dogs are carnivorous mammals.

- (i) Define the term *carnivore*.

..... [1]

- (ii) State **one** external feature which distinguishes mammals from other vertebrates.

..... [1]

- (b) (i) Suggest two reasons why numbers of African wild dogs are decreasing.

1.

2. [2]

- (ii) Suggest what could happen to the species if numbers continue to decrease.

.....

..... [1]

- (c) Using the information in the passage above, construct a food chain for a wild dog, including its predator.

Label each organism with its trophic level.

[4]

(d) It is important that the wild dog species is conserved.

(i) Explain the meaning of the term *conservation*.

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

(ii) Outline the measures that could be taken to conserve a mammal, such as the wild dog.

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

(e) When wild dogs die, nitrogen compounds in their bodies may become available for plants. Outline the processes that occur to make these nitrogen compounds in the bodies of dead animals available for plants to absorb.

.....
.....
.....
.....
.....
.....
.....
..... [5]

[Total: 19]

For
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- 3 Catalase is an enzyme found in plant and animal cells. It has the function of breaking down hydrogen peroxide, a toxic waste product of metabolic processes.

For
Examiner's
Use

- (a) (i) State the term used to describe the removal of waste products of metabolism.

..... [1]

- (ii) Define the term *enzyme*.

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

An investigation was carried out to study the effect of pH on catalase, using pieces of potato as a source of the enzyme.

Oxygen is formed when catalase breaks down hydrogen peroxide, as shown in the equation.



The rate of reaction can be found by measuring how long it takes for 10 cm³ oxygen to be collected.

- (b) (i) State the independent (input) variable in this investigation.

..... [1]

- (ii) Suggest two factors that would need to be kept constant in this investigation.

1.
2. [2]

Table 3.1 shows the results of the investigation, but it is incomplete.

Table 3.1

pH	time to collect 10 cm ³ oxygen / min	rate of oxygen production / cm ³ min ⁻¹
4	20.0	0.50
5	12.5	0.80
6	10.0	1.00
7	13.6	0.74
8	17.4	

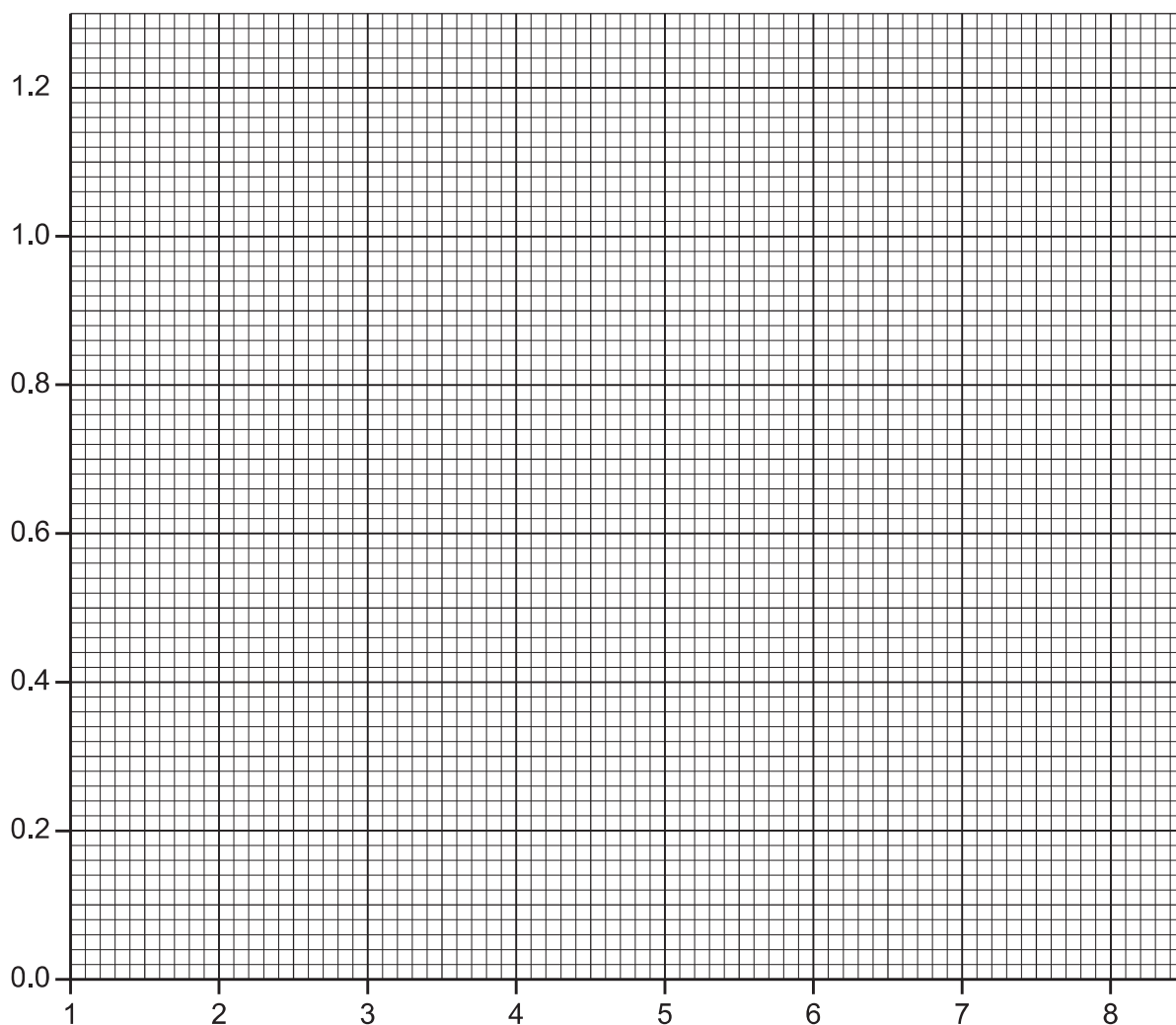
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(c) Calculate the rate of oxygen production at pH 8.

Show your working. Write your answer in Table 3.1

[2]

(d) Complete the graph by plotting the rate of oxygen production against pH.



[4]

(e) (i) Using data from the graph, describe the changes in the reaction rate between **pH 4** and **pH 8**.

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

(ii) Explain the change in the reaction rate between **pH 6** and **pH 8**.

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

[Total: 17]

For
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4 Fig. 4.1 shows three species of zebra.

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Use

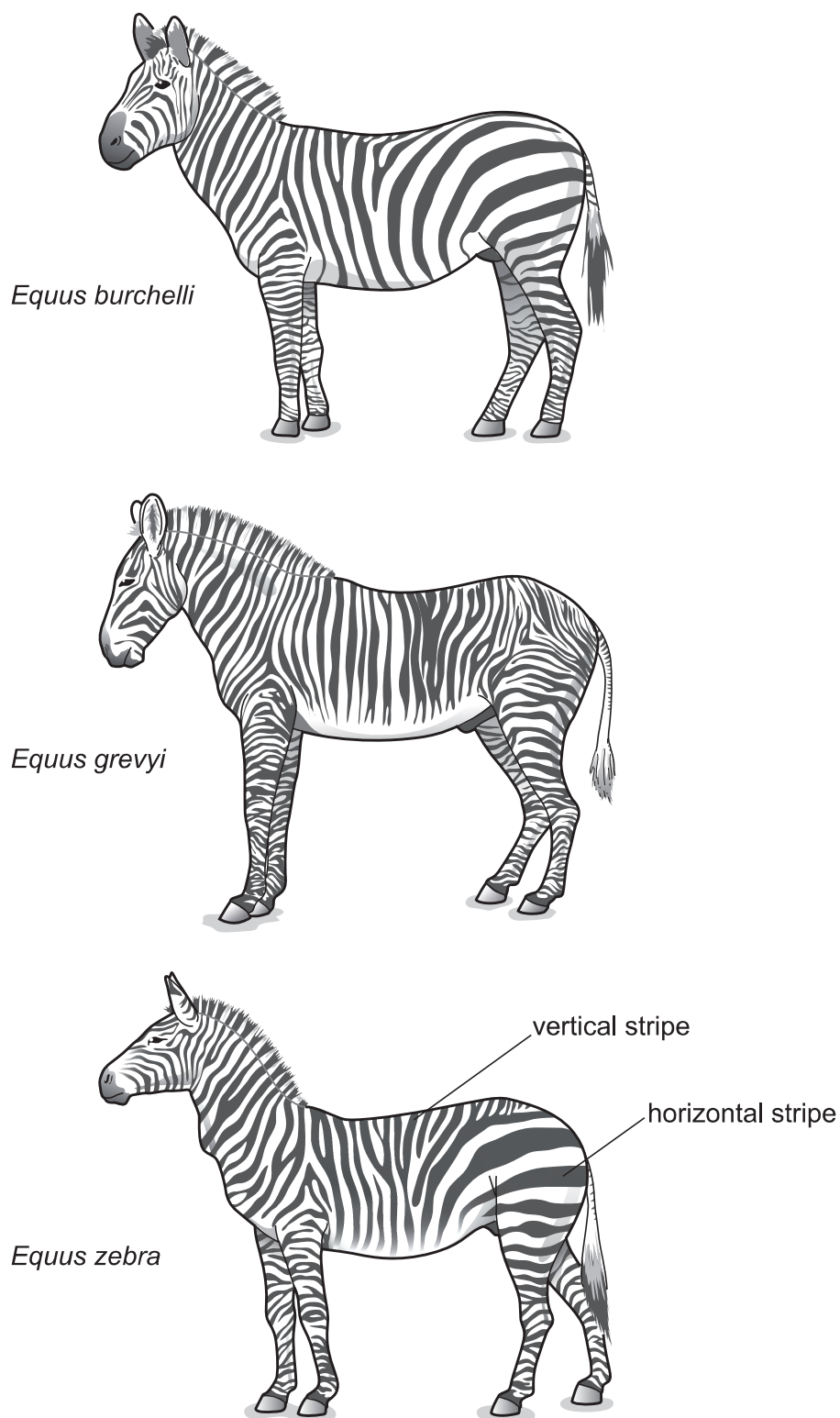


Fig. 4.1

- (a) Describe **one** method a scientist could use to show that the zebras shown in Fig. 4.1 are different species.

.....
..... [1]

- (b) Studies have shown that the hotter the environment, the more stripes zebras have.

(i) State the type of variation which would result in different numbers of stripes.
..... [1]

(ii) Study Fig. 4.1. Suggest which species of zebra lives in the hottest environment.
..... [1]

- (c) Occasionally, zebras are born that are almost completely black. The change in appearance is the result of mutation.

(i) State the term that is used to describe the appearance of an organism.
..... [1]

(ii) Define the term *mutation*.
.....
..... [2]

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- (d) Tsetse flies attack animals with short fur, sucking their blood and spreading diseases.

Fig. 4.2 shows a tsetse fly. This fly is an insect, belonging to the arthropod group.

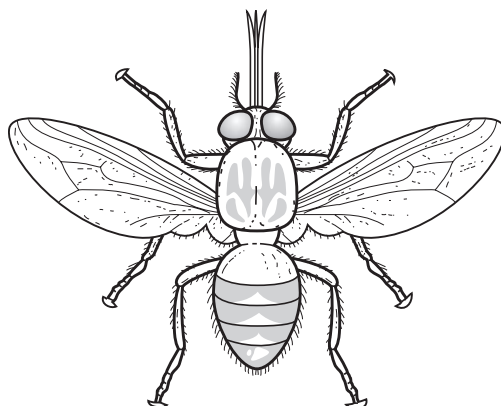


Fig. 4.2

- (i) State **one** feature, **visible in Fig. 4.2**, which is common to all arthropods.

..... [1]

- (ii) State two features, **visible in Fig. 4.2**, which distinguish insects from other arthropod groups.

1.

2. [2]

- (e) Scientists have discovered that zebras with more horizontal stripes attract fewer tsetse flies.

- (i) Suggest why the stripes on the head and neck of the zebra would be an advantage when it feeds on grass on the ground.

.....

..... [2]

- (ii) Describe how a species of zebra could gradually develop more horizontal stripes.

.....

.....

.....

..... [3]

[Total: 14]

5 To stay healthy we need a balanced diet.

(a) Define the term *balanced diet*.

.....

.....

..... [2]

Protein is one nutrient present in a balanced diet. The body cannot store protein, so any excess amino acids are broken down in the process of deamination, as shown in Fig. 5.1.

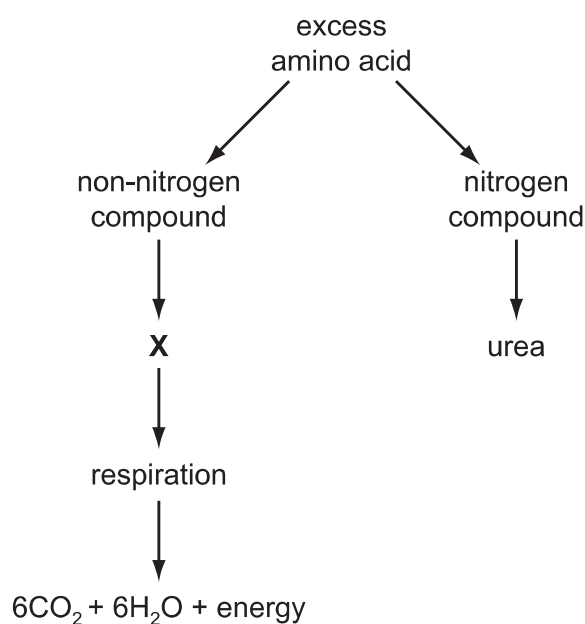


Fig. 5.1

(b) (i) Name the organ where deamination takes place.

..... [1]

(ii) Compound **X** is used as an energy source in respiration.

Suggest the name of compound **X**.

..... [1]

(iii) State the type of respiration shown in Fig. 5.1.

Explain your answer.

type of respiration

explanation

[2]

(c) The urea produced is transported to the kidney, where it is excreted.

Describe how urea is transported in the blood to the kidney.

.....

[2]

Fig. 5.2 shows a kidney tubule (nephron) and its associated blood vessels.

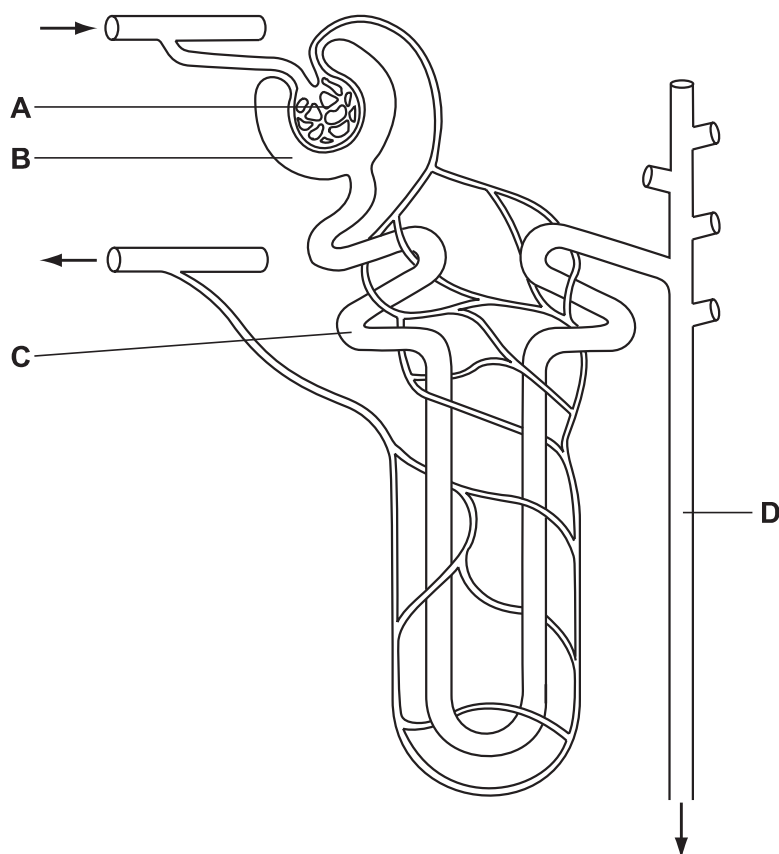


Fig. 5.2

For
Examiner's
Use

- (d) Complete the table by naming the parts labelled **A** to **D** and stating **one** function for each.

For
Examiner's
Use

	name of part	function
A		
B		
C		
D		

[8]

- (e) The volume of blood filtered by the kidneys is $1.18 \text{ dm}^3 \text{ min}^{-1}$.

- (i) Calculate the total volume of blood filtered in 24 hours.

Show your working.

volume = [2]

- (ii) If the total volume of urine produced in 24 hours is 1.7 dm^3 , calculate the percentage volume of the filtered blood excreted as urine in 24 hours.

Show your working.

% volume = [2]

[Total: 20]

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