



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

CANDIDATE  
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**BIOLOGY**

**0610/21**

Paper 2 Core

**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 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                  |  |
| 6                  |  |
| 7                  |  |
| 8                  |  |
| 9                  |  |
| <b>Total</b>       |  |

This document consists of **14** printed pages and **2** blank pages.



1 (a) Fig. 1.1 shows a mammal.



Fig. 1.1

Describe two external features that occur in mammals but do **not** occur in other vertebrates.

- 1. ....
- .....
- 2. ....
- ..... [2]

(b) Fig. 1.2 shows an arthropod.

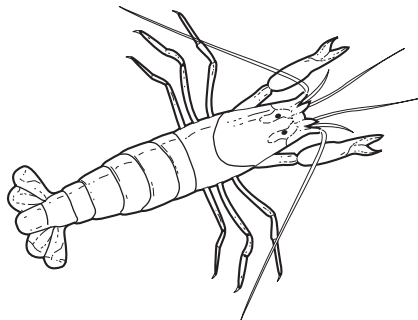


Fig. 1.2

Describe two external features that occur in all arthropods.

- 1. ....
- .....
- 2. ....
- ..... [2]

[Total: 4]

2 Fig. 2.1 shows a population growth graph for a herbivorous insect that has just entered a new habitat.

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Examiner's  
Use

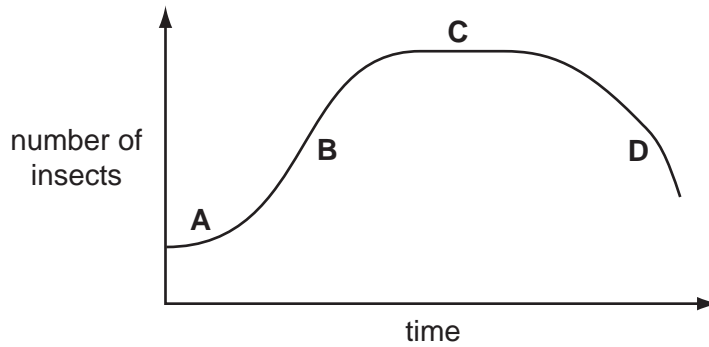


Fig. 2.1

(a) (i) Which of the four phases, labelled A, B, C and D, represents the stationary phase and which the lag phase?

stationary phase .....

lag phase ..... [2]

(ii) During which phases will some of this insect population die?

phases ..... [2]

(b) (i) State two factors that could affect the rate of population growth during phase C.

factor 1 .....

factor 2 ..... [2]

(ii) Suggest how these two factors might change. Explain how each change would affect the rate of population growth.

factor 1 .....

.....

.....

factor 2 .....

.....

..... [4]

[Total: 10]

3 Fig. 3.1 shows a section through the heart.

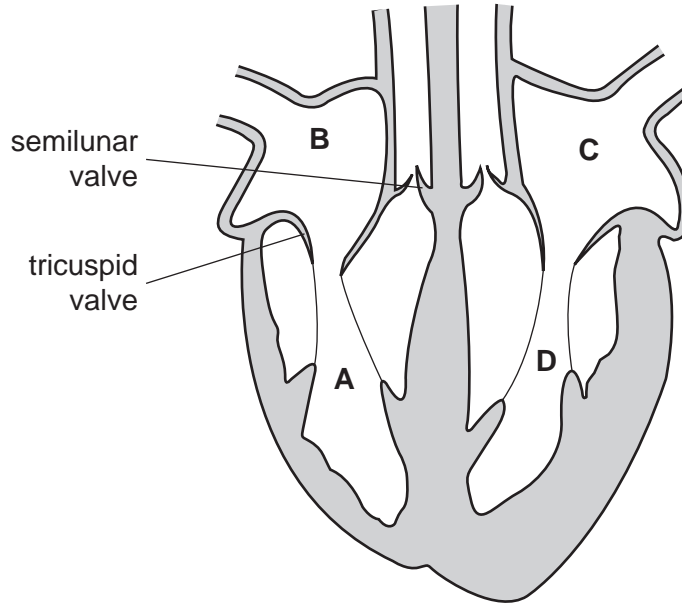


Fig. 3.1

(a) (i) Name the chamber of the heart labelled **D**.

..... [1]

(ii) State which of the chambers, **A** to **D**, contain deoxygenated blood.

..... [1]

(b) The pulmonary blood vessels carry blood into and away from the heart.

Complete Table 3.1 to give three differences between the pulmonary artery and the pulmonary vein.

Table 3.1

|   | pulmonary artery | pulmonary vein |
|---|------------------|----------------|
| 1 |                  |                |
| 2 |                  |                |
| 3 |                  |                |

[3]

(c) (i) State the function of the valves within the heart.

..... [1]

(ii) Suggest what causes the tricuspid valve to open.

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

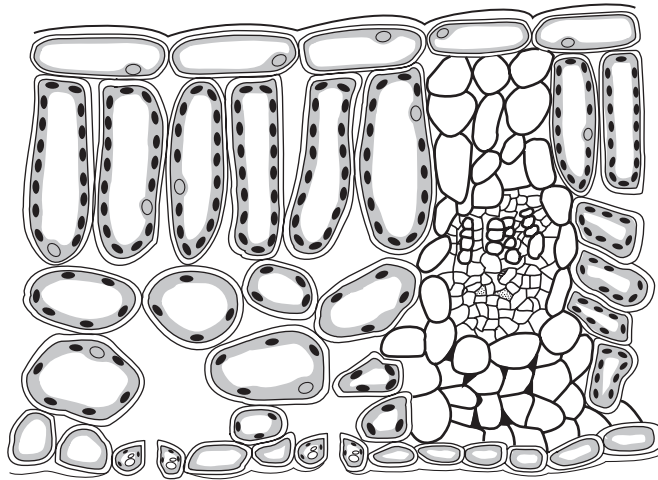
(iii) Suggest why it is important that when the semilunar valves are open, the tricuspid and bicuspid valves are closed.

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

[Total: 10]

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4 Fig. 4.1 shows a section through a leaf.



**Fig. 4.1**

**(a)** On Fig. 4.1, label a stoma, the cuticle and a vascular bundle.

Use label lines and the words 'stoma', 'cuticle' and 'vascular bundle' on Fig. 4.1. [3]

**(b) (i)** The upper layers of a leaf are transparent. Suggest an advantage to a plant of this feature.

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

**(ii)** The cuticle is made of a waxy material. Suggest an advantage to a plant of this feature.

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

**(iii)** State two functions of vascular bundles in leaves.

1. ....  
 .....  
 2. ....  
 ..... [2]

(c) Most photosynthesis in plants happens in leaves.

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Use

(i) Name the two raw materials needed for photosynthesis.

1. ....

2. .... [2]

(ii) Photosynthesis produces glucose.

Describe how plants make use of this glucose.

.....

.....

.....

.....

..... [3]

[Total: 12]

- 5 (a) (i) In the box, state the word equation for aerobic respiration.

|  |
|--|
|  |
|--|

[2]

- (ii) Complete Table 5.1 to show three differences between aerobic respiration and anaerobic respiration in humans.

**Table 5.1**

|   | aerobic respiration<br>in humans | anaerobic respiration<br>in humans |
|---|----------------------------------|------------------------------------|
| 1 | .....<br>.....                   | .....<br>.....                     |
| 2 | .....<br>.....                   | .....<br>.....                     |
| 3 | .....<br>.....                   | .....<br>.....                     |

[3]

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Use*



(b) Yeast is used in making some types of bread and in brewing.

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Use*

(i) Explain the role of yeast in bread making.

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

(ii) Explain the role of yeast in brewing.

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

[Total: 10]

6 Complete the sentences by writing the most appropriate word in each space.

Use only words from the box.

|          |         |              |            |
|----------|---------|--------------|------------|
| allele   | diploid | dominant     | gene       |
| genotype | haploid | heterozygous | homozygous |
| meiosis  | mitosis | phenotype    | recessive  |

Wing length in the fruit fly, *Drosophila*, is controlled by a single .....  
 that has two forms, one for long and one for short wings. The sperm and ova of fruit flies  
 are produced by the process of ..... . When fertilisation occurs the  
 gametes fuse to form a ..... zygote.  
 When two long-winged fruit flies were crossed with each other some of the offspring were  
 short-winged. The ..... of the rest of the offspring was long-winged.  
 The short-winged form is ..... to the long-winged form and each of  
 the parents must have been .....

[6]

[Total: 6]

For  
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7 Suggest and explain three ways in which human activities can bring about air pollution. In each case, name the pollutant.

*For  
Examiner's  
Use*

1. ....  
.....  
.....  
.....

2. ....  
.....  
.....  
.....

3. ....  
.....  
.....  
.....

[6]

[Total: 6]

8 Fig. 8.1 shows a section through a pea flower.

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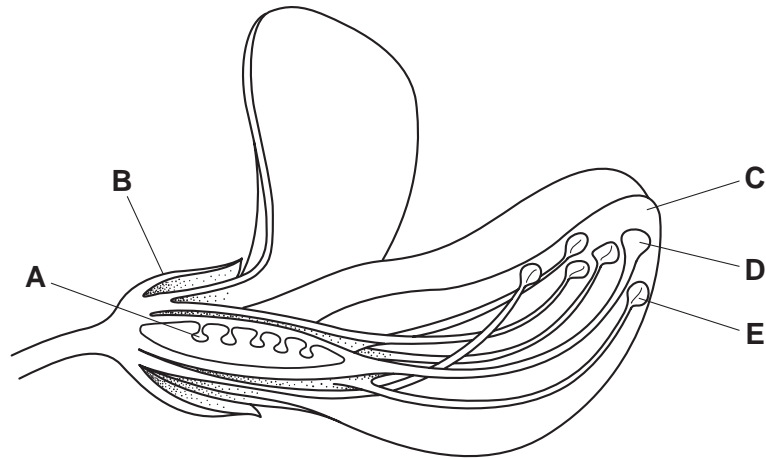


Fig. 8.1

(a) Name the parts labelled **A** and **B**.

**A** .....

**B** ..... [2]

(b) This flower is insect-pollinated.

(i) Define the term *pollination*.

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

(ii) Suggest how parts **C**, **D** and **E** work together to bring about insect-pollination in this flower.

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

(c) Suggest how a wind-pollinated flower would be different from the flower shown in Fig. 8.1.

.....  
.....  
.....  
.....  
.....  
..... [4]

(d) After both pollination and fertilisation have happened, a flower produces seeds.

These seeds can germinate and grow into new plants.

For germination to happen a number of environmental factors must be present, including oxygen, a suitable temperature and water.

Explain why each of these three factors is essential for successful germination.

oxygen .....

.....

suitable temperature .....

.....

water .....

..... [3]

[Total: 14]

9 (a) The kidney is an excretory organ.

Name two other excretory organs in humans and in each case state a substance that the organ excretes.

1. organ .....

substance excreted .....

2. organ .....

substance excreted ..... [4]

(b) Table 9.1 shows the amounts of some substances in the blood in the renal artery and in the renal vein of a **healthy** person.

**Table 9.1**

| substance    | amount in blood in renal artery<br>(arbitrary units) | amount in blood in renal vein<br>(arbitrary units) |
|--------------|------------------------------------------------------|----------------------------------------------------|
| oxygen       | 100.0                                                | 35.0                                               |
| glucose      | 10.0                                                 | 9.7                                                |
| sodium salts | 32.0                                                 | 29.0                                               |
| urea         | 3.0                                                  | 0.5                                                |
| water        | 180.0                                                | 178.0                                              |

Suggest what happens in the kidney to bring about the differences in the composition of the blood shown in Table 9.1.

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 8]



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