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| Centre Number | Candidate Number | Name |
|---------------|------------------|------|

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**BIOLOGY**

**0610/02**

Paper 2

May/June 2004

**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 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.

| For Examiner's Use |  |
|--------------------|--|
| 1                  |  |
| 2                  |  |
| 3                  |  |
| 4                  |  |
| 5                  |  |
| 6                  |  |
| 7                  |  |
| 8                  |  |
| <b>Total</b>       |  |

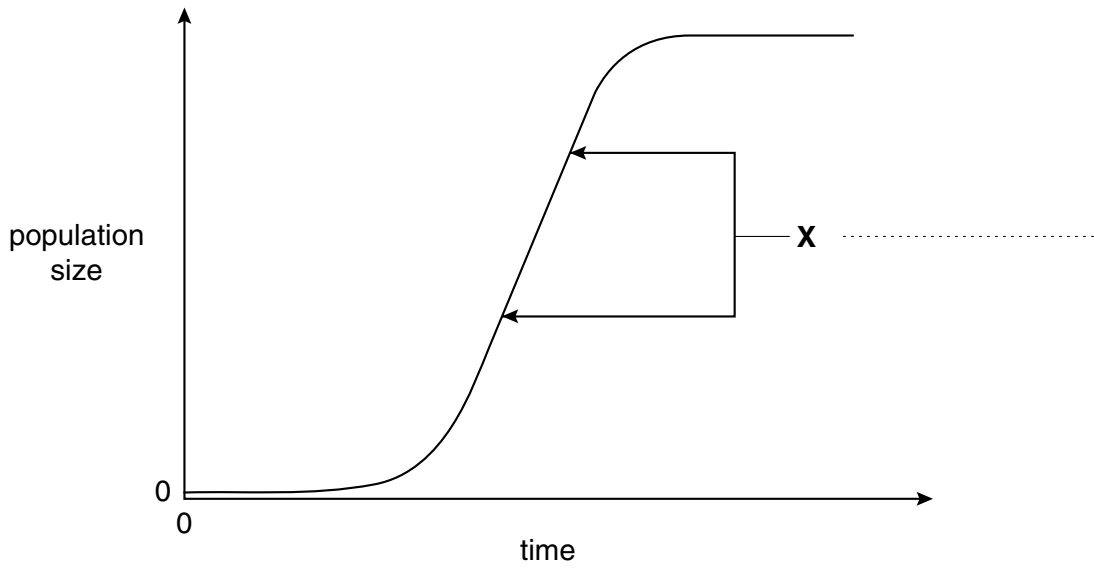
If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

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



1 Fig. 1.1 shows changes in the population of yeast during the production of beer.



**Fig. 1.1**

(a) (i) On Fig. 1.1 name the phase labelled X. [1]

(ii) Suggest two reasons why the population stops growing.

1. ....

2. .... [2]

(b) Write an equation, in either words or chemical symbols, for anaerobic respiration by yeast.

..... [2]

(c) Alcohol has long term effects that cause damage to some body organs.

Name two of these organs and state an effect that alcohol can have on each of these organs.

1 Organ .....

Effect .....

.....

2 Organ .....

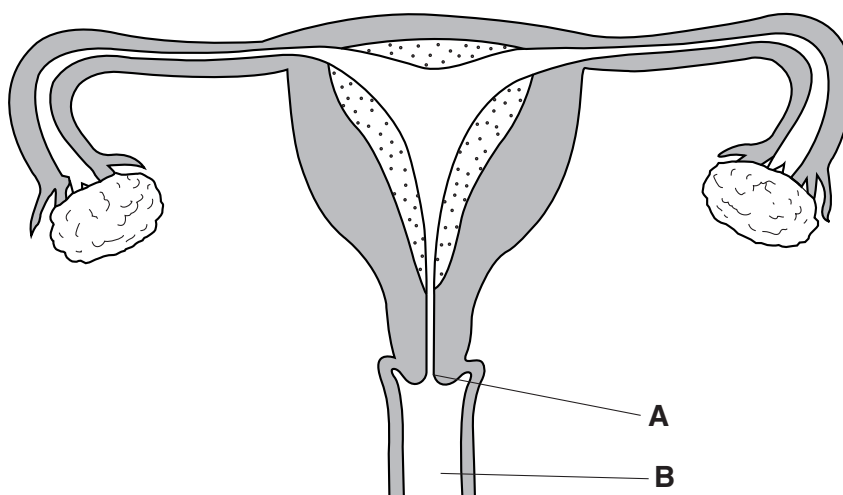
Effect .....

..... [4]

[Total: 9]

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2 Fig. 2.1 shows the female reproductive system.



**Fig. 2.1**

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

**A** .....

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

(b) Label, on Fig. 2.1, with the appropriate letter, where

(i) fertilisation normally occurs – **F**. [1]

(ii) gametes are produced – **G**. [1]

(iii) oestrogen is produced – **O**. [1]

(c) List three secondary sexual characteristics that are stimulated by oestrogen.

1. ....

2. ....

3. .... [3]

(d) Outline the changes occurring in the ovaries and uterus during the menstrual cycle.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 12]

3 Fig. 3.1 shows the ears (fruiting heads) of five types of cereal.

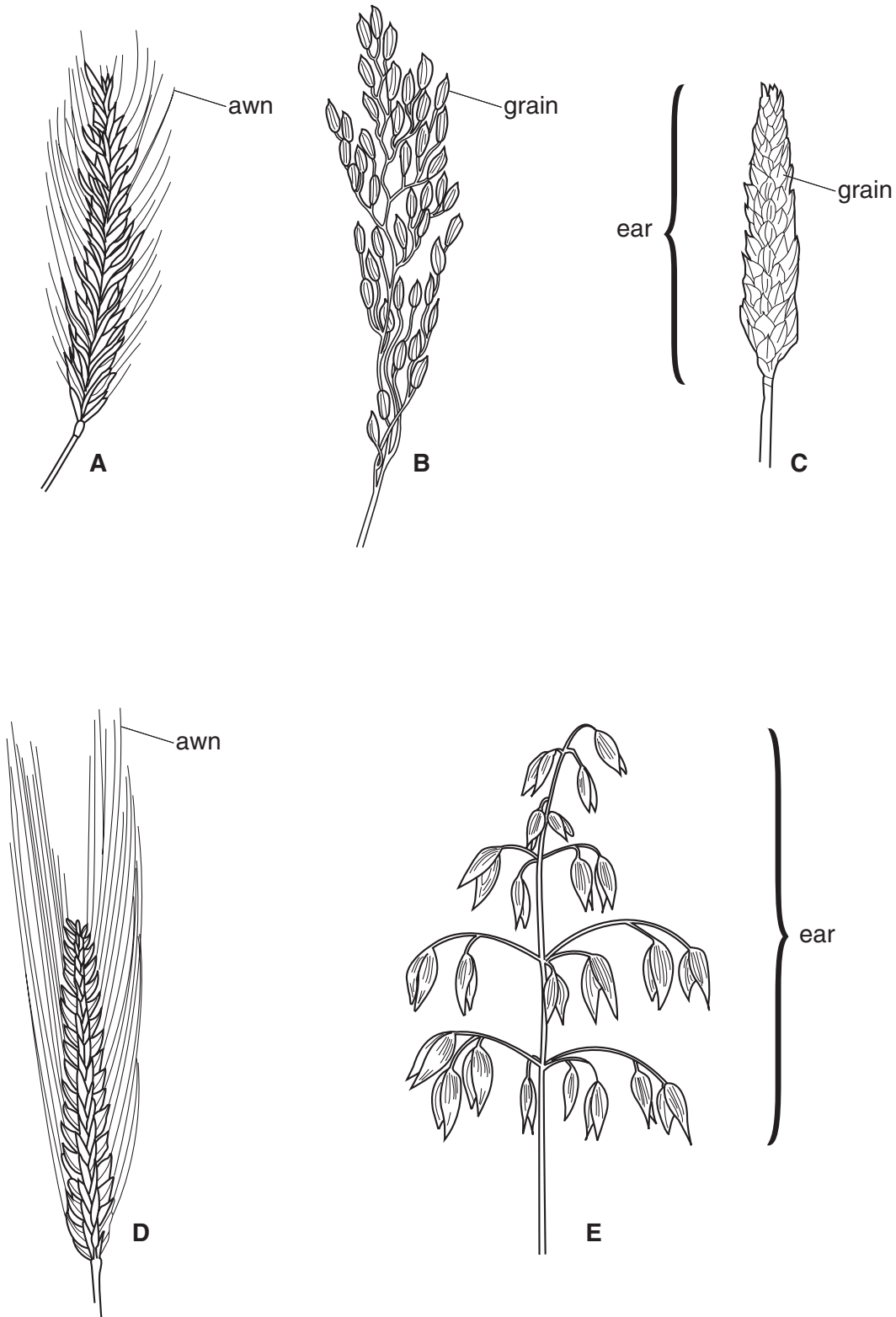


Fig. 3.1

- (a) Use the key to identify each of the types of cereal in Fig. 3.1. Write the names of the cereals in Table 3.1.

**Key**

|   |                                                                                              |                                 |
|---|----------------------------------------------------------------------------------------------|---------------------------------|
| 1 | Awns present<br>Awns absent                                                                  | 2<br>3                          |
| 2 | Individual awns can be longer than whole ear.<br>Individual awns never longer than whole ear | <i>Hordeum</i><br><i>Secale</i> |
| 3 | Grains not close together in the ear<br>Grains very close together in the ear                | 4<br><i>Triticum</i>            |
| 4 | Grains hang down from stalks<br>Grains do not hang down from stalks                          | <i>Avena</i><br><i>Oryza</i>    |

**Table 3.1**

| diagram letter | name of cereal |
|----------------|----------------|
| <b>A</b>       |                |
| <b>B</b>       |                |
| <b>C</b>       |                |
| <b>D</b>       |                |
| <b>E</b>       |                |

[4]

- (b) Most cereal plants are wind-pollinated. Suggest three ways in which cereal flowers may differ from insect-pollinated flowers.

1. ....
2. ....
3. .... [3]

(c) Plants need both magnesium ions and nitrate ions for healthy development.

(i) State why each of these is important for healthy development.

magnesium ions .....

.....

nitrate ions .....

..... [2]

(ii) Nitrate ions are often provided in fertilisers. Excess fertiliser may be washed into streams and ponds polluting the water. Suggest what is likely to happen in the stream or pond.

.....

.....

.....

.....

.....

..... [4]

[Total: 13]



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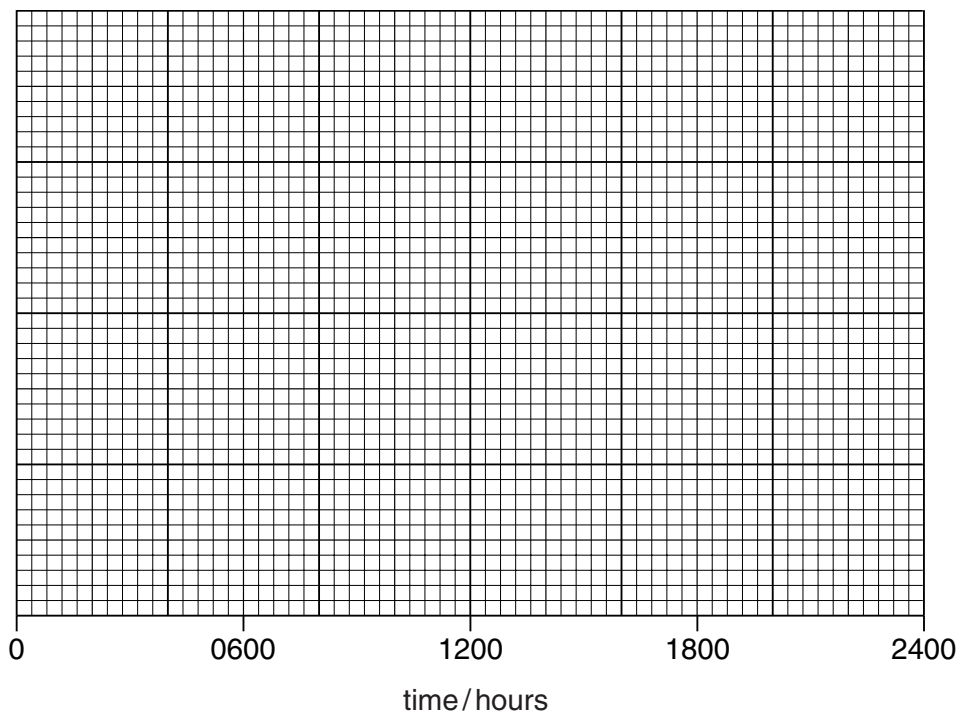
- 4 Table 4.1 shows the rate of water loss by a plant over a period of 24 hours.

**Table 4.1**

| time / hours | rate of water loss / grams per hour |
|--------------|-------------------------------------|
| 0300         | 6                                   |
| 0600         | 12                                  |
| 0900         | 18                                  |
| 1200         | 24                                  |
| 1500         | 24                                  |
| 1800         | 20                                  |
| 2100         | 10                                  |
| 2400         | 8                                   |

- (a) Plot the above data on Fig. 4.1.

[3]



**Fig. 4.1**

(b) (i) Predict and explain how a large increase in humidity at 1000 hours would affect the rate of water loss in the next two hours.

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

(ii) State two environmental factors, apart from humidity, that can cause a change in water loss and explain how each of these has its effect.

1 factor .....  
explanation .....  
.....  
.....  
2 factor .....  
explanation .....  
.....  
..... [6]

(c) (i) Name the tissue that transports water to the leaves of a plant.  
..... [1]

(ii) State one other function of this tissue.  
..... [1]

[Total: 13]

- 5 Use only words or letters from the list below to complete the sentences in the following paragraph.

|          |             |               |              |
|----------|-------------|---------------|--------------|
| diploid, | forty-four, | forty-six,    | gamete,      |
| haploid, | twenty-two, | twenty-three, | X, Y, zygote |

The nuclei of human body cells contain ..... pairs of chromosomes, that is ..... chromosomes and two sex chromosomes.

Sperm cells have a ..... nucleus with a single sex chromosome.

The ..... formed from the fusion of an ovum with a sperm cell, containing a ..... sex chromosome, will develop into a male.

[Total: 5]

6 Table 6.1 gives some details of the digestion of food. Complete Table 6.1.

**Table 6.1**

| food material | digestive enzyme | source of enzyme     | end products     |
|---------------|------------------|----------------------|------------------|
| starch        | .....            | salivary glands<br>+ | .....            |
| .....         | .....            | stomach              | .....            |
| fat           | .....            | pancreas             | fatty acids<br>+ |
|               |                  |                      | .....            |

[8]

[Total: 8]

7 Fig. 7.1 shows a food web from farmland in Europe.

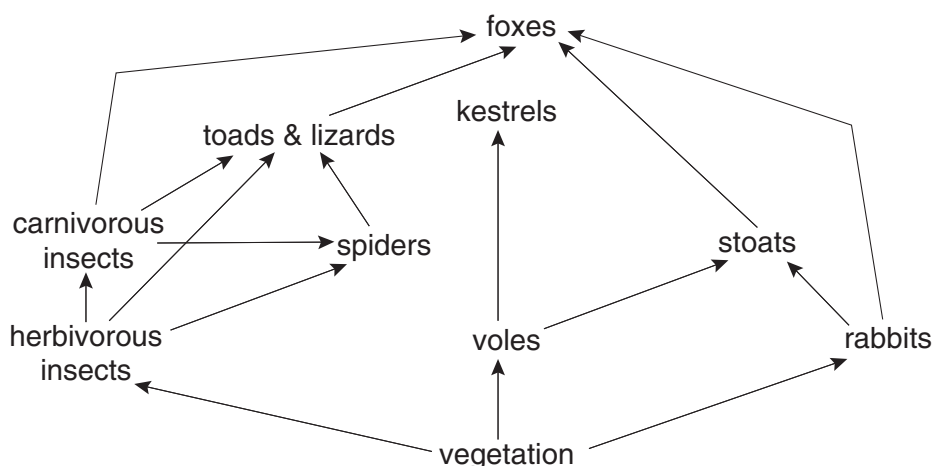


Fig. 7.1

(a) (i) Name an organism from the fourth trophic level of this food web.

..... [1]

(ii) Using examples from this food web explain the difference between primary and secondary consumers.

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

(b) (i) State the **source** of energy for this food web.

..... [1]

(ii) In the food web the herbivorous insect population receives the same total amount of energy as the rabbit population. The rabbits pass a smaller percentage of this total energy to the next trophic level compared with the herbivorous insects. Suggest reasons for this difference.

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

(c) Myxomatosis is a disease of rabbits from which there is a high death rate.

Explain a likely effect on the population of kestrels if there was a serious outbreak of myxomatosis in the rabbit population.

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

[Total: 13]

8 (a) During exercise the rate of blood flow to skeletal muscle is increased.

Explain why this is necessary.

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

(b) (i) Name the hormone that can cause an increased flow of blood to skeletal muscle.

..... [1]

(ii) Suggest two ways by which the heart can increase the flow of blood.

1. ....

2. .... [2]

[Total: 7]

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