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Candidate Name \_\_\_\_\_

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
**Joint Examination for the School Certificate**  
**and General Certificate of Education Ordinary Level**

**BIOLOGY**  
**PAPER 2**

**5090/2**

**OCTOBER/NOVEMBER SESSION 2002**

1 hour 45 minutes

Additional materials:  
Answer paper

**TIME** 1 hour 45 minutes

**INSTRUCTIONS TO CANDIDATES**

Write your name, Centre number and candidate number in the spaces at the top of this page and on all separate answer paper used.

**Section A**

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

**Section B**

Answer **three** questions.

Write your answers on the separate answer paper provided.

At the end of the examination,

1. fasten all separate answer paper securely to the question paper;
2. write an E (for Either) or an O (for Or) next to the number 8 in the grid below to indicate which question you have answered.

**INFORMATION FOR CANDIDATES**

The intended number of marks is given in brackets [ ] at the end of each question or part question.

You are advised to spend no longer than one hour on Section A and no longer than 45 minutes on Section B.

<b>FOR EXAMINER'S USE</b>	
<b>Section A</b>	
<b>Section B</b>	
<b>6</b>	
<b>7</b>	
<b>8</b>	
<b>TOTAL</b>	

Section A

Answer all the questions.

Write your answers in the spaces provided.

- 1 Fig. 1.1 shows an apparatus used to investigate fermentation, a form of anaerobic respiration that can take place in the cytoplasm of yeast cells.

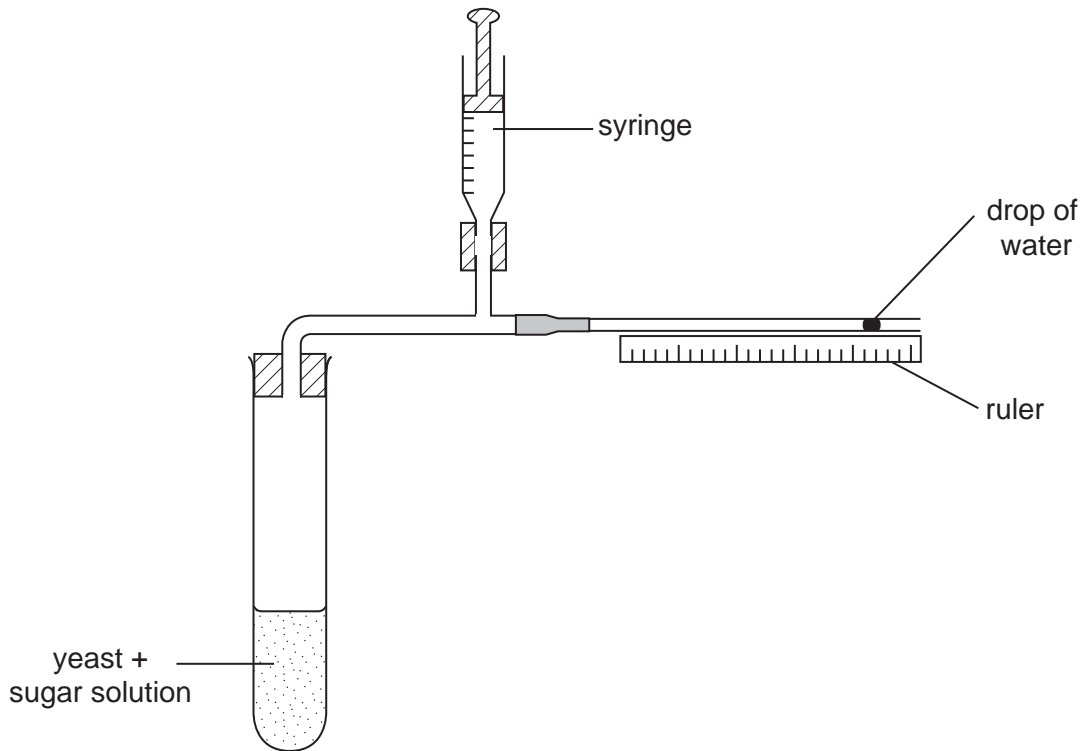


Fig. 1.1

(a) Name the gas given off during fermentation. ....[1]

(b) State the use of the syringe in this apparatus.

.....[1]

(c) In each case, state and explain the effect on fermentation of raising the temperature

(i) from 20 °C to 45 °C;

*effect* .....

*explanation* .....

.....

(ii) from 45 °C to 70 °C.

*effect* .....

*explanation* .....

.....

[4]

Using the apparatus in Fig. 1.1, an experiment was carried out at 30 °C with each of three different sugars, **E**, **F** and **G**, all at the same concentration.

Table 1.1 shows the distances moved by the drop of water over equal periods of time for each of the sugars.

**Table 1.1**

sugar	distance / mm
<b>E</b>	250
<b>F</b>	50
<b>G</b>	0

One of the sugars was glucose. Glucose molecules are approximately half the size of the molecules of the other two sugars.

(d) State which sugar, **E**, **F** or **G**, is most likely to be glucose and give a reason for your answer.

*sugar* .....

*reason* .....

.....[2]

(e) Suggest why no gas was given off when sugar **G** was used.

.....[1]

[Total : 9]

- 2 Fig. 2.1 shows the chromosomes of a human body cell (with matching chromosomes side-by-side in pairs).

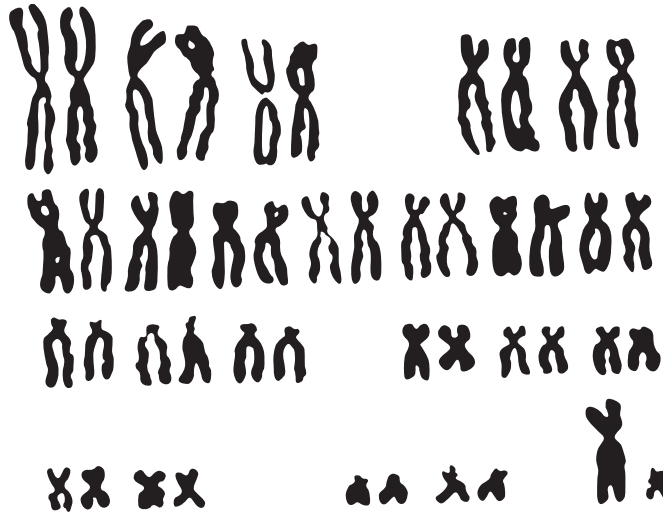


Fig. 2.1

- (a) Name the part of the cell in which chromosomes are found.

.....[1]

- (b) State the sex of the person from whom this cell was taken. Give a reason for your answer.

*sex of person* .....

*reason* .....[2]

- (c) Explain how it is possible to tell that this person does **not** suffer from Down's syndrome.

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

- (d) Describe how the chromosomes in a gamete from the same person would differ in appearance from Fig. 2.1.

.....[1]

(e) Fig. 2.2 shows the chromosomes from a body cell of a species of insect.



Fig. 2.2

With reference to Figs. 2.1 and 2.2, suggest why gametes from a male and a female of different species usually cannot produce a zygote.

.....

.....[1]

[Total : 6]

3 Fig. 3.1 shows a section through the human eye.

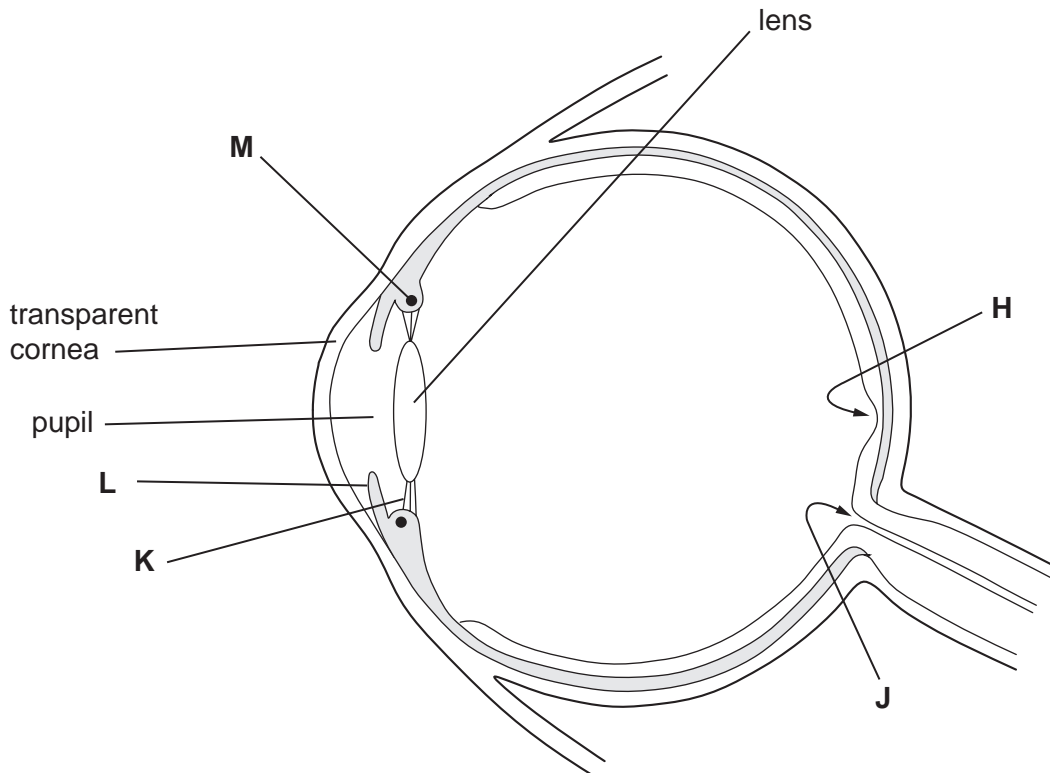


Fig. 3.1

(a) Identify structures H, J, K and L.

- H .....
- J .....
- K .....
- L .....

[4]

(b) Using information in Fig. 3.1, state, with an explanation in each case, whether the eye

(i) is looking at a near or distant object;  
*near or distant object* .....

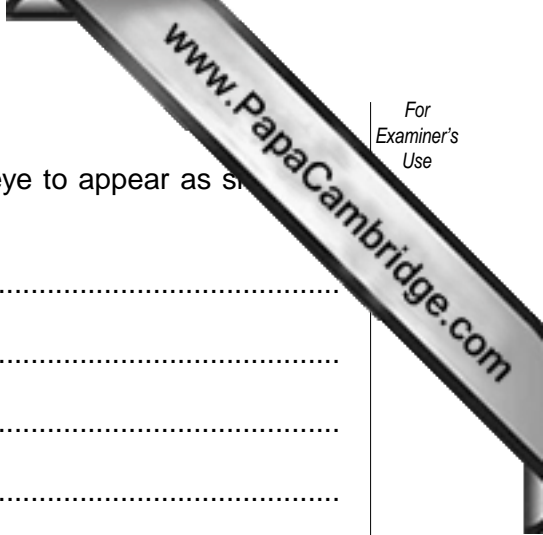
*explanation* .....

.....

(ii) is in bright or dim light.  
*bright or dim light* .....

*explanation* .....

.....



(c) Explain what is occurring in structures **K**, **L** and **M** for the eye to appear as shown in Fig. 3.1.

**K** .....

.....

**L** .....

.....

**M** .....

.....[6]

(d) (i) State which part of the eye contains light-sensitive cells.

.....

(ii) Explain why a person is not normally aware of a blind spot in their field of vision.

.....

.....

.....[2]

[Total : 14]

4 Fig. 4.1 shows the appearance of stomata of two plants over a 24-hour period. The plants are growing side-by-side, but are of different species.

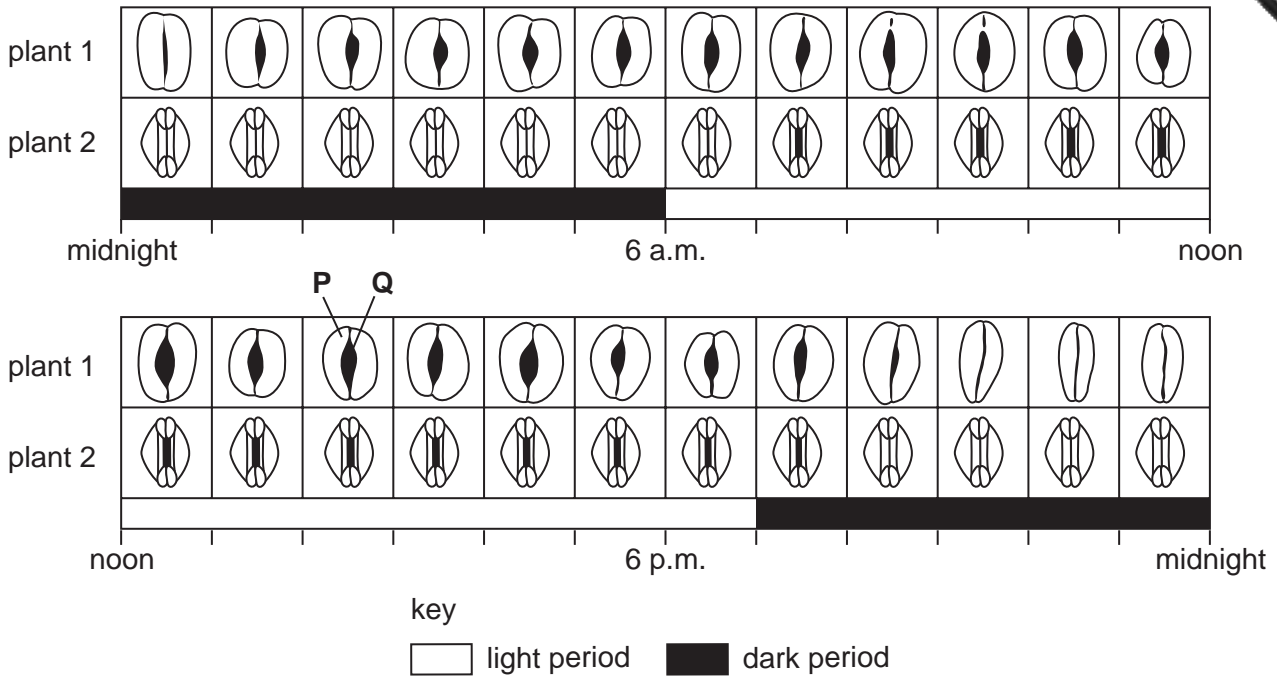


Fig. 4.1

(a) Name P and Q.

P .....

Q .....

[2]

(b) (i) Name a process that can occur in plant 1 between 1 a.m. and 5 a.m. that might not occur during this time in plant 2. Explain your answer.

process .....

explanation .....

.....

(ii) Name another process that can occur in plant 1 between 6 a.m. and 7 a.m. that might not occur during this time in plant 2. Explain your answer.

process .....

explanation .....

.....

[4]



(c) Suggest and explain what effect a shortage of soil water might have on the stomatal pores in plant 1.

*effect* .....

*explanation* .....

.....

.....[2]

[Total : 8]

5 Fig. 5.1 shows different types of human teeth.

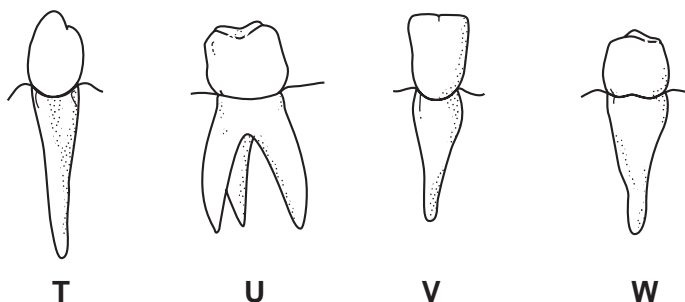


Fig. 5.1

(a) Name the types of tooth shown.

T .....

U .....

V .....

W .....

[4]

Fig. 5.2 shows a view from above of teeth in a human lower jaw.

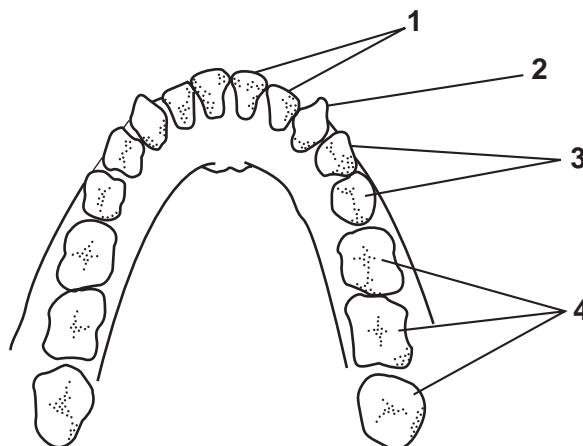
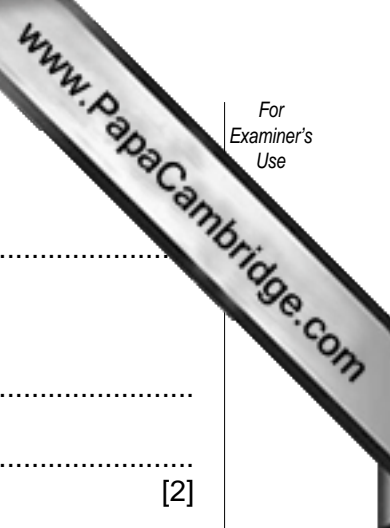


Fig. 5.2

(b) By matching each letter from Fig. 5.1 with a number from Fig. 5.2, complete Table 5.1 to show the position occupied by each type of tooth.

Table 5.1

type of tooth	position number
T	
U	
V	
w	



(c) (i) State which type of tooth is used for grinding the walls of plant cells.

.....

(ii) Suggest why grinding is important in animals that are herbivores.

.....

.....

[2]

(d) (i) Name the enzyme that is found in the mouth cavity and state its substrate and product.

*enzyme* .....

*substrate* .....

*product* .....

(ii) Explain why the reaction that this enzyme catalyses does **not** occur in the stomach, but does occur in the duodenum.

.....

.....

.....

[5]

[Total : 13]

## Section B

Answer **three** questions.

Question **8** is in the form of an **Either/Or** question. Only one part should be answered.

Write your answers on the separate answer paper provided.

- 6** (a) Describe, with examples, the difference between *continuous variation* and *discontinuous variation*. [6]
- (b) Explain how variation within one species may eventually lead to the development of two separate species. [4]
- [Total : 10]
- 7** (a) Describe the functions of the testes. [3]
- (b) Describe the part played by the uterus in the development of an embryo from the time of ovulation to the birth of the baby. [7]
- [Total : 10]
- 8** **Either** (a) List the main characteristics of bacteria. [4]
- (b) Describe the role of bacteria in
- (i) decomposition;
- (ii) yoghurt production. [6]
- [Total : 10]
- Or** (a) List the main characteristics of fungi. [4]
- (b) Describe the use of fermenters in the production of
- (i) antibiotics;
- (ii) single cell protein. [6]
- [Total : 10]